

KANSAS STATE AGRICULTURAL COLLEGE BULLETIN

VOLUME I

MAY 15, 1917

NUMBER 9

CATALOGUE

FIFTY-FOURTH SESSION

1916-1917



ANNOUNCEMENTS

1917-1918

MANHATTAN, KANSAS
PUBLISHED BY THE COLLEGE

6-6738

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The Board of Administration*

THE HON. ED. T. HACKNEY, *President*... Term expires July 1, 1917
Wellington, Sumner county.

THE HON. E. W. HOCH Term expires July 1, 1917
Marion, Marion county.

THE HON. (MRS.) CORA G. LEWIS..... Term expires July 1, 1917
Kinsley, Edwards county.

LEE HARRISON, *Secretary*.
Topeka, Shawnee county.

Administrative Officers

President HENRY JACKSON WATERS

Dean of the Division of Agriculture and
Director of the Agricultural Experiment
Station WILLIAM M. JARDINE

Dean of the Division of Mechanic Arts and
Director of the Engineering Experiment
Station ANDREY A. POTTER

Dean of the Division of General Science.. J. T. WILLARD

Dean of the Division of Home Economics.. MRS. MARY P. VAN ZILE

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Librarian ARTHUR B. SMITH

Custodian G. F. WAGNER

* This Board of Administration of State Educational Institutions is to be superseded on July 1, 1917, according to legislative enactment, by the "State Board of Administration" of all State institutions, consisting of the governor of the State and three other members.

† E. H. Reisner, acting director, summer of 1916.

1917							1918													
JULY							JANUARY							JULY						
S	T	W	T	F	S		S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7	..	..	1	2	3	4	5	..	1	2	3	4	5	6
8	9	10	11	12	13	14	6	7	8	9	10	11	12	7	8	9	10	11	12	13
15	16	17	18	19	20	21	13	14	15	16	17	18	19	14	15	16	17	18	19	20
22	23	24	25	26	27	28	20	21	22	23	24	25	26	21	22	23	24	25	26	27
29	30	31	..	..	..	..	27	28	29	30	31	..	..	28	29	30	31	..	..	..
..
AUGUST							FEBRUARY							AUGUST						
..	..	..	1	2	3	4	..	..	..	..	..	1	2	..	..	..	1	2	3	
5	6	7	8	9	10	11	3	4	5	6	7	8	9	4	5	6	7	8	9	10
12	13	14	15	16	17	18	10	11	12	13	14	15	16	11	12	13	14	15	16	17
19	20	21	22	23	24	25	17	18	19	20	21	22	23	18	19	20	21	22	23	24
26	27	28	29	30	31	..	24	25	26	27	28	..	..	25	26	27	28	29	30	31
..
SEPTEMBER							MARCH							SEPTEMBER						
..	..	..	..	..	1		..	..	..	..	1	2		1	2	3	4	5	6	7
2	3	4	5	6	7	8	3	4	5	6	7	8	9	8	9	10	11	12	13	14
9	10	11	12	13	14	15	10	11	12	13	14	15	16	15	16	17	18	19	20	21
16	17	18	19	20	21	22	17	18	19	20	21	22	23	22	23	24	25	26	27	28
23	24	25	26	27	28	29	24	25	26	27	28	29	30	29	30	..	..	..	..	..
30	..	..	..	..	..	..	31	..	..	..	..	..	..	..	..	..	..	..	..	..
OCTOBER							APRIL							OCTOBER						
..	1	2	3	4	5	6	..	1	2	3	4	5	6	..	1	2	3	4	5	
7	8	9	10	11	12	13	7	8	9	10	11	12	13	6	7	8	9	10	11	12
14	15	16	17	18	19	20	14	15	16	17	18	19	20	13	14	15	16	17	18	19
21	22	23	24	25	26	27	21	22	23	24	25	26	27	20	21	22	23	24	25	26
28	29	30	31	..	..	..	28	29	30	..	..	..	..	27	28	29	30	31	..	..
..
NOVEMBER							MAY							NOVEMBER						
..	..	..	..	1	2	3	..	..	1	2	3	4		..	..	..	..	1	2	
4	5	6	7	8	9	10	5	6	7	8	9	10	11	3	4	5	6	7	8	9
11	12	13	14	15	16	17	12	13	14	15	16	17	18	10	11	12	13	14	15	16
18	19	20	21	22	23	24	19	20	21	22	23	24	25	17	18	19	20	21	22	23
25	26	27	28	29	30	..	26	27	28	29	30	31	..	24	25	26	27	28	29	30
..
DECEMBER							JUNE							DECEMBER						
..	..	..	..	..	1		..	..	..	..	1			1	2	3	4	5	6	7
2	3	4	5	6	7	8	2	3	4	5	6	7	8	8	9	10	11	12	13	14
9	10	11	12	13	14	15	9	10	11	12	13	14	15	15	16	17	18	19	20	21
16	17	18	19	20	21	22	16	17	18	19	20	21	22	22	23	24	25	26	27	28
23	24	25	26	27	28	29	23	24	25	26	27	28	29	29	30	31	..	..	..	..
30	31	..	..	..	..	..	30	..	..	..	..	..	..	..	..	..	..	..	..	..

The College Calendar

1917.

Sept. 8, Saturday.—Meeting of assigners with Committee on Schedule at 2 p. m.
 Sept. 8, Saturday.—Meeting of assigners with Deans at 3 p. m.
 Sept. 10, Monday.—Admission and registration of students begins at 9 a. m.
 Sept. 10, Monday.—Housekeepers Course begins.
 Sept. 12, Wednesday.—Registration of students closes at 11 a. m.
 Sept. 12, Wednesday.—Opening convocation, 11 a. m. to 12 m.
 Sept. 12, Wednesday.—All classes meet according to schedule, beginning at 1 p. m.
 Oct. 4, Saturday.—Examinations to remove conditions.
 Oct. 11, Saturday.—Scholarship deficiency reports due.
 Oct. 22, Monday.—Shop Short Course begins.
 Nov. 17, Saturday.—Scholarship deficiency reports due.
 Nov. 28, Wednesday.—Thanksgiving vacation begins at 12 m.
 Dec. 1, Saturday.—Thanksgiving vacation closes at 6 p. m.
 Dec. 15, Saturday.—Shop Short Course closes at 12 m.
 Dec. 21, Friday.—Winter vacation begins at 6 p. m.

1918.

Jan. 4, Friday.—Winter vacation closes at 6 p. m.
 Jan. 7, Monday.—Shop Short Course, Traction Engine Short Course, and Road-building Short Course begin.
 Jan. 7, Monday.—Short Course in Agriculture begins.
 Jan. 7, Monday.—Creamery Short Course begins.
 Jan. 26, Saturday.—Housekeepers Short Course closes at 11 a. m.
 Jan. 26, Saturday.—First semester closes at 11 a. m.

Jan. 29, Tuesday.—Admission and registration of students begins at 9 a. m.
 Jan. 29, Tuesday.—Housekeepers Course begins.
 Jan. 30, Wednesday.—Registration of students closes at 11 a. m.
 Jan. 30, Wednesday.—All classes meet according to schedule, beginning at 1 p. m.
 Feb. 22, Friday.—Holiday, Washington's Birthday.
 Feb. 28, Saturday.—Examinations to remove conditions.
 Mar. 2, Saturday.—Scholarship deficiency reports due.
 Mar. 2, Saturday.—All short courses in mechanic arts close at 12 m.
 Mar. 2, Saturday.—Short Course in Agriculture closes at 12 m.
 Mar. 2, Saturday.—Creamery Short Course closes at 12 m.
 April 6, Saturday.—Scholarship deficiency reports due.
 May 16 to 22, Thursday to Wednesday.—Examinations for seniors.
 May 21 to 28, Tuesday to Tuesday.—Examinations at close of semester.
 May 29, Wednesday.—Commencement day.

May 31, Friday.—Registration of students for Summer School begins at 8 a. m.
 May 31 to August 2, Friday to Friday.—Summer School in session.

Sept. 9, Monday.—Admission and registration of students begins at 9 a. m.
 Sept. 11, Wednesday.—Registration of students closes at 11 a. m.

Students must be present the very first day of each semester or render a reasonable excuse. Failure to take out an assignment is not accepted as an excuse for absence from classes. A fee of one dollar is charged those who enroll after the time set for close of registration unless a good excuse is offered.

HERBERT FULLER ROBERTS, LL. B., M. S.,

Professor of Botany.

A. B., University of Kansas, 1891; LL. B., Northwestern University Law School (Chicago), 1893; M. S., Kansas State Agricultural College, 1898; Admission to the Bar, Supreme Court of Illinois, 1893; Assistant in Law Offices, Kansas City, Missouri, 1893-'94; Graduate Student in Biology, Kansas State Agricultural College, 1894-'98; Graduate Student, University of Chicago, 1898-'99; Instructor in Botany, Washington University, 1899-1901; Professor of Botany, Kansas State Agricultural College, 1901—. Office H 58; Res. 1920 Poyntz Ave.

ALBERT DICKENS, M. S.,

Professor of Horticulture.

B. S., Kansas State Agricultural College, 1893; M. S., *ibid.*, 1901; Foreman, Munger Orchards, Eureka, 1895; State Teachers' Certificate, 1895; Teacher, Ellinwood High School, 1897-'98; Teachers' Life Certificate, 1898; Assistant in Horticulture, Kansas State Agricultural College, 1899-1901; Acting Professor of Horticulture, *ibid.*, 1901-'02; Professor of Horticulture, *ibid.*, 1902—. Office H. 30; Res. 509 N. Manhattan Ave.

RALPH RAY PRICE, A. M.,

Professor of History and Civics.

A. B., Baker University, 1896; A. M., University of Kansas, 1898; Assistant in History, *ibid.*, 1897-1900; Graduate Student, University of Chicago, Summer, 1899; Teacher of History and Civics, Lawrence High School, 1898-1901; Graduate Student, University of Wisconsin, Summer, 1901; Teacher of History and Civics, Ishpeming (Michigan) High School, 1901-'02; Graduate Student, Cornell University, Summer, 1902; Teacher of History and Civics, and Assistant Principal, Rockford (Illinois) High School, 1902-'03; Graduate Student, University of Michigan Law School, Summer, 1909; Professor of American History and Government, University of Kansas, Summer, 1911; Professor of History and Civics, Kansas State Agricultural College, 1903—. Office F 57; Res. 826 Houston St.

JULIUS ERNEST KAMMEYER, A. M., LL. D.,

Professor of Economics.

A. B., Central Wesleyan College, 1886; A. M., *ibid.*, 1889; LL. D., Kansas City University, 1912; Public Schools of Missouri, 1886-'93; Teacher of History and Civics, Kansas City (Kansas) High School, 1893-'97; Vice Principal and Teacher of Economics, *ibid.*, 1897-1903; Professor of Oratory, Kansas State Agricultural College, 1903-'04; Graduate Student, University of Chicago, Summer, 1910; Professor of Economics, Kansas State Agricultural College, 1904—. Office A 52; Res. 1419 Humboldt St.

JOHN VANZANDT CORTELYOU, PH. D.,

Professor of German.

A. B., University of Nebraska, 1897; A. M., *ibid.*, 1901; Ph. D., University of Heidelberg, 1904; Assistant Principal, Humboldt (Nebraska) High School, 1897-'98; Principal, *ibid.*, 1898-'99; Graduate Student University of Nebraska, 1899-1901; Graduate Student, University of Heidelberg, 1901-'04; Research Work, British Museum (London) and Bibliotheque Nationale (Paris), Summer, 1903; President, Kansas Association of Teachers of German, 1912-'15; Professor of German, Kansas State Agricultural College, 1904—. Office N 59; Res. 5 Park Road.

FRANCIS SIEGEL SCHOENLEBER,¹ D. V. S., M. S. A.,

Professor of Veterinary Medicine.

B. S. A., Iowa State College, 1885; M. S. A., *ibid.*, 1887; D. V. S., Chicago Veterinary College, 1890; M. D., Harvey Medical College, Chicago, Ill., 1901; M. D., National Medical University, Chicago, Ill., 1901; Assistant in Agriculture, Iowa State College, 1885-'88; Associate Editor, *Orange Judd Farmer*, Chicago, 1888-'90; Private Veterinary Practice, 1890-'96; Dean, McMillip Veterinary College, Chicago, 1896-'99; and 1901-'05; Private Human Practice, 1901-'05; Professor of Veterinary Medicine, Kansas State Agricultural College, 1905-'17.

1. Resigned.

Standing Committees of the Faculty

ADMISSION: Jessie McD. Machir, J. V. Cortelyou, B. L. Remick, Ina Holroyd, Bessie W. Birdsall, J. O. Hamilton, W. H. Andrews, P. S. Welch, S. L. Simmering, G. A. Dean.

ADVANCED CREDIT: *College*.—R. R. Price, L. E. Call, R. A. Seaton, H. H. King, J. R. Macarthur, Jen L. Cox, J. T. Willard.

School of Agriculture: H. L. Kent, Ada Rice, E. V. James, W. T. Stratton.

ASSIGNMENT: Jessie McD. Machir, L. A. Fitz, R. A. Seaton, W. H. Andrews, Jen L. Cox, A. E. White.

ATHLETICS: President Waters, W. M. Jardine, Z. G. Clevenger, G. A. Dean, R. A. Seaton, H. H. King.

CATALOGUE: J. V. Cortelyou, H. F. Roberts, J. R. Macarthur.

COLLEGE RULES: R. R. Price, J. T. Willard, J. E. Kammeyer.

"COLLEGE STUDIES": A. A. Potter, J. O. Hamilton, L. E. Call, H. F. Roberts, A. B. Smith.

DEBATE: J. R. Macarthur, J. G. Emerson, J. E. Kammeyer.

DISCIPLINE: Albert Dickens, L. A. Fitz, L. E. Conrad.

GRADUATE STUDY: A. A. Potter, Mary P. Van Zile, J. T. Willard, L. E. Call.

PLACES OF MEETING: J. T. Willard.

PUBLIC EXERCISES: J. E. Kammeyer, J. V. Cortelyou, A. E. Wesbrook, J. W. Searson.

SCHEDULE OF CLASSES: J. T. Willard, A. E. White.

STUDENT AFFAIRS: J. O. Hamilton, H. H. King, E. L. Holton, Mary P. Van Zile, W. M. Jardine.

STUDENT ASSEMBLY: J. E. Kammeyer.

STUDENT HEALTH: L. E. Conrad, L. D. Bushnell, L. W. Goss.

Officers of Instruction and Administration

PRESIDENT

HENRY JACKSON WATERS, B. S. A., LL. D.,

President of the College.

B. S. A., University of Missouri, 1886; LL. D., New Hampshire State College, 1913; LL. D., University of Missouri, 1916; Assistant Secretary, Missouri State Board of Agriculture, 1886-'88; Assistant in Agriculture to Missouri Experiment Station, 1888-'91; Professor of Agriculture, Pennsylvania State College, and Agriculturist, Pennsylvania Experiment Station, 1892-'95; Instructor in Animal Nutrition, Graduate School of Agriculture, University of Ohio, 1902; Director Missouri State Agricultural Exhibit, World's Fair, St. Louis, 1903-'04; Student, Universities of Leipzig and Zurich, 1904-'05; Instructor in Animal Nutrition, Graduate School of Agriculture, University of Illinois, 1906; President, Missouri State Board of Agriculture, 1908-'09; Dean of the College of Agriculture, Director of the Experiment Station, and Professor of Agriculture, University of Missouri, 1895-'09; President, Kansas State Teachers' Association, 1911-'12; President, International Dry-farming Congress, 1913-'14; Special Commissioner to the Philippine Islands, 1914; President, American Society for the Promotion of Agricultural Science, 1913-'14; President, Kansas State Agricultural College, 1909—.

Office* A 30; Res. 2 Park Road.

PROFESSORS

JOHN DANIEL WALTERS, M. S., A. D.,

Professor of Architecture and Drawing.

M. S., Kansas State Agricultural College, 1883; A. D., *ibid.*, 1908; Student, College of Solothurn, Switzerland, 1863-'67; Instructor, Agricultural Experiment Station, Klingenberg, Switzerland, 1865-'66; Student, University of Bern, 1867; Instructor in Industrial Art, Kansas State Agricultural College, 1876-'85; Professor of Industrial Art and Design, *ibid.*, 1885-1904; Professor of Architecture and Drawing, *ibid.*, 1904—.

Office E 56; Res. 809 N. Eleventh St.

JULIUS TERRASS WILLARD, Sc. D.,

Dean of the Division of General Science; Professor of Chemistry.

B. S., Kansas State Agricultural College, 1883; M. S., *ibid.*, 1886; Sc. D., *ibid.*, 1908; Assistant in Chemistry, *ibid.*, 1883-'87; Graduate Student, Johns Hopkins University, 1887-'88; Assistant Chemist, Kansas Experiment Station, 1888-'97; Assistant Professor of Chemistry, Kansas State Agricultural College, 1890-'96; Associate Professor Chemistry, *ibid.*, 1896-'97; Chemist, Kansas Experiment Station, 1897—; Professor of Applied Chemistry, Kansas State Agricultural College, 1897-'01; Director, Kansas Experiment Station, 1900-'06; Vice Director, *ibid.*, 1907—; Professor of Chemistry, Kansas State Agricultural College, 1901—; Dean of the Division of General Science, *ibid.*, 1909—; Chemist, Engineering Experiment Station, *ibid.*, 1910—.

Office C 30; Res. 1725 Poyntz Ave.

BENJAMIN LUCE REMICK, Ph. M.,

Professor of Mathematics.

Ph. B., Cornell College, 1889; Ph. M., *ibid.*, 1892; Instructor, Cornell College Academy, 1889-'92; Graduate Student, Johns Hopkins University, 1892-'93; Instructor, Northwestern University Academy, 1893-'94; Graduate Student, University of Chicago, 1894-'95; Professor of Mathematics, University of the Pacific, 1895-'96; Graduate Student, University of Chicago, 1896-'98; Associate, Bradley Institute, Peoria, Illinois, 1898-1900; Professor of Mathematics, Kansas State Agricultural College, 1900—.

Office A 71; Res. 613 Houston St.

* Buildings are designated by letters, as follows:

A—Anderson Hall (Main).	L—Domestic Science and Art Hall.
Ag—Agricultural Hall.	M—Auditorium.
C—Denison Hall.	N—Nichols Gymnasium.
D—Dairy Hall.	R—Farm Machinery Hall (Old Armory).
E—Mechanical Engineering Hall.	S—Engineering Shops.
F—Fairchild Hall (Library).	V—Veterinary Hall.
G—School of Agriculture Hall.	W—Chemistry Annex.
H—Horticultural Hall.	X—Horticultural Laboratory.
K—Kedzie Hall (Printing).	

JOHN ORR HAMILTON, B. S.,

Professor of Physics.

B. S., University of Chicago, 1900; Student, Monmouth College, 1888-'90; Superintendent, Roseville (Illinois) Public Schools, 1894-'98; Instructor in Science, Mount Barbara Military Academy (Salina), 1900-'01; Assistant in Physics, Kansas State Agricultural College, 1901-'03; Assistant Professor of Physics, *ibid.*, 1903-'08; in Charge of Electrical Engineering, *ibid.*, January 1, 1918-'14; Professor of Physics, *ibid.*, 1908—.
Office C 57; Res. 6 Park Road.

MARY PIERCE VAN ZILE,

Dean of the Division of Home Economics; Professor of Domestic Science.

Teacher, Winfield (Iowa) Schools, 1888-'89; Student, Kansas State Agricultural College, 1889-'91; Principal, Wayland (Iowa) High School, 1891-'92; Teacher's Diploma, Iowa State College, 1902; Instructor in Domestic Science, *ibid.*, 1902-'03; Student, Graduate School of Domestic Science, University of Illinois, Summer, 1903; Domestic Science Lecturer and Demonstrator at Chautauqua, Summers of 1903-'05; Teacher of Domestic Science and Art, Township High School, Chicago, 1903-'08; Member, University of Illinois High School Council, 1905-'08; Professor of Domestic Science, Kansas State Agricultural College, 1908—; Dean of Women, *ibid.*, 1908-'13; Dean of the Division of Home Economics, 1913—.
Office L 30; Res. 1322 Fremont St.

LOWELL EDWIN CONRAD, M. S.,

Professor of Civil Engineering.

B. S., Cornell College, 1904; C. E., *ibid.*, 1906; M. S., Lehigh University, 1908; Chairman, Union Pacific Railroad Company, 1899; Chairman, Illinois Central Railroad Company, 1900; Levelman, Vicksburg National Military Park, 1900-'01; Field Draftsman, Choctaw, Oklahoma and Gulf Railroad Company, 1901; Instrument Man, Mexican Central Railway Company, 1902-'03; Inspector and Instrument Man on Sewer Construction, Centralia, Illinois, 1904; Assistant Engineer on Construction, Gulf Terminus of the Tehuantepec Route, Mexico, 1905-'06; Instructor and Graduate Student in Civil Engineering, Lehigh University, 1906-'08; Assistant Professor of Civil Engineering, Kansas State Agricultural College, 1908-'09; Professor of Civil Engineering, *ibid.*, 1909—.
Office E 32; Res. 317 N. Seventeenth St.

CHARLES ANDERSON SCOTT,¹ B. S.,*Kansas State Forester.*

B. S., Kansas State Agricultural College, 1901; Forest Expert, U. S. Forest Service, 1901-'04; Graduate Student, Yale University Forest School, 1904-'05; Forest Supervisor, U. S. Forest Service, 1905-'07; Special Lecturer on Forestry Subjects, University of Nebraska, Winters, 1906 and 1907; Professor of Forestry, Iowa State College, 1908-'10; Kansas State Forester, Kansas State Agricultural College, 1910-'17.

LESLIE ARTHUR FITZ, B. S.,

Professor of Milling Industry.

B. S., Kansas State Agricultural College, 1902; Grain Investigation, U. S. Department of Agriculture, 1902-'06; Office of Grain Standardization, *ibid.*, 1906-'10; in Charge of Department of Milling Industry, Kansas State Agricultural College, 1910-'12; Professor of Milling Industry, *ibid.*, 1912—.
Office Ag 40; Res. 1014 Houston St.

EDWIN LEE HOLTON,⁶ A. B.,*Professor of Education; Director of the Summer School.*

A. B., Indiana University, 1904; Graduate, Indiana State Normal School, 1900; Principal, Township Consolidated Schools, Madison County, Indiana, 1900-'02; Graduate Student, Indiana University, Winter and Spring Terms, 1904; Superintendent City Schools, Holton, Kansas, 1904-'06; Superintendent City Schools, Noblesville, Indiana, 1906-'08; Graduate Student, Columbia University, 1908-'10; Supervisor Industrial Schools, New York City, 1909-'10; Graduate Student, Teachers' College, Columbia University, 1916-'17; Professor of Rural Education, Kansas State Agricultural College, 1910-'18; Director of the Summer School, *ibid.*, 1910—; Professor of Education, *ibid.*, 1918—.
Office A 32; Res. 217 Park Road.

1. Resigned.

6. Absent on leave, year 1916-'17.

ANDREY ABRAHAM POTTER, S. B.,

Dean of the Division of Mechanic Arts; Director of Engineering Experiment Station; Professor of Steam and Gas Engineering.

S. B., Massachusetts Institute of Technology, 1908; with Experimental Steam Turbine Department, General Electric Company, Schenectady, New York, 1903-'05; Graduate Student, Columbia University, Summer, 1908; with General Electric Company, Lynn, Massachusetts, Summer, 1913; Assistant Professor of Mechanical Engineering, Kansas State Agricultural College, 1905-'10; Professor of Steam and Gas Engineering, *ibid.*, 1910—; in Charge of Mechanical Engineering, *ibid.*, 1910—; Acting Dean of the Division of Engineering, and Acting Director of Engineering Experiment Station, *ibid.*, 1913 - April, 1914; Dean of the Division of Mechanic Arts, and Director of the Engineering Experiment Station, *ibid.*, April, 1914—.

Office E 80; Res. 1328 Fremont St.

ROY ANDREW SEATON, M. S.,

Professor of Applied Mechanics and Machine Design.

B. S., Kansas State Agricultural College, 1904; M. S., *ibid.*, 1910; S. B., Massachusetts Institute of Technology, 1911; Assistant in Mathematics, Kansas State Agricultural College, 1904-'06; Assistant Professor, *ibid.*, 1906; Graduate Student, University of Wisconsin, Summer, 1908; Instructor in Mechanical Engineering, Kansas State Agricultural College, 1907-'09; Assistant Professor of Mechanical Engineering, *ibid.*, 1909-'10; Graduate Student, Massachusetts Institute of Technology, 1910-'11; in Turbine Drafting Department, General Electric Company, Lynn, Massachusetts, 1911-'12; Professor of Applied Mechanics and Hydraulics, Kansas State Agricultural College, 1910-'14; Professor of Applied Mechanics and Machine Design, *ibid.*, 1914—.

Office S 61; Res. 722 Humboldt St.

WILLIAM M. JARDINE, B. S. A., LL. D.,

Dean of the Division of Agriculture; Director of the Agricultural Experiment Station.

B. S. A., Utah Agricultural College, 1904; LL. D., Campbell College, 1916; Instructor in Agronomy, Utah Agricultural College, 1904-'05; Manager, Utah Arid Farming Company, Utah, 1905; Assistant Professor of Agronomy, Utah Agricultural College, 1905; Student, Graduate School of Agriculture, University of Illinois, 1906; Professor of Agronomy, Utah Agricultural College, 1906-'07; Assistant Cerealist, U. S. Department of Agriculture, 1907-'10; Instructor in Field Crops, Graduate School of Agriculture, Michigan Agricultural College, 1912; Professor of Agronomy, Kansas State Agricultural College, 1910-'13; Acting Dean of the Division of Agriculture, and Acting Director of the Agricultural Experiment Station, *ibid.*, January 1-September 1, 1913; Dean of the Division of Agriculture, and Director of the Agricultural Experiment Station, *ibid.*, 1913—.

Office Ag 34; Res. 1020 Houston St.

JAMES WILLIAM SEARSON,⁵ A. M.,

Professor of English.

A. B., University of Nebraska, 1896; Fellow in History, *ibid.*, 1896-'98; A. M., *ibid.*, 1899; Principal, Weeping Water (Nebraska) High School, 1894-'95; Instructor and Lecturer in State and County Teachers' Institutes, 1895—; Superintendent, Wahoo (Nebraska) Schools, 1899-'05; Professor of English and Rhetoric, Nebraska State Normal School (Peru), 1905-'10; Lecturer in Summer School, University of Utah, 1914; Special Editor for Kansas School Book Commission, 1916-'17; Associate Professor of English, Kansas State Agricultural College, 1910-'11; Professor of English, *ibid.*, 1911—.

Office K 27; Res. 1320 Fremont St.

OLLIE EZEKIEL REED, M. S.,

Professor of Dairy Husbandry.

B. S. in Agriculture, University of Missouri, 1908; M. S., *ibid.*, 1910; Assistant in Dairy Husbandry, *ibid.*, 1908-'09; Instructor in Milk Production, Purdue University, 1909-'10; Assistant Professor in Charge of Dairy Husbandry, Kansas State Agricultural College, 1910-'11; Professor of Dairy Husbandry, *ibid.*, 1911—.

Office D 80; Res. 321 N. Sixteenth St.

5. Absent on leave, March 25, 1916, to March 25, 1917.

ARTHUR BOURNE SMITH, PH. B., B. L. S.,

Librarian.

Ph. B., Wesleyan University, 1900; B. L. S., University of Illinois, 1902; Librarian in Charge, Genesee Wesleyan Seminary, New York, 1892-'95; Principal, Smithboro (New York) Public Schools, 1895-'96; Assistant in Library, Wesleyan University, 1896-1900; Library Assistant, University of Illinois, 1900-'02; Assistant Editor, *Cumulative Book Index United States Catalogue, and Reader's Guide to Periodical Literature*, June-September, 1902; Lecturer on Bibliography, University of California, 1903; Head of Order Department of Library, *ibid.*, 1903-June, 1911; Head of Accession Division of Library, *ibid.*, July-August, 1911; Instructor in Summer School, *ibid.*, 1906 and 1907; Librarian, Kansas State Agricultural College, 1911—.

Office F 32; Res. R. F. D. 2.

WILLIAM ADAMS LIPPINCOTT,⁶ A. B., B. S.,

Professor of Poultry Husbandry.

A. B., Illinois College, 1903; B. S., Iowa State College, 1911; Secretary, Young Men's Christian Association, Chicago, 1903-'04; Student, Chicago Theological Seminary, 1904-'06; Poultry Farming, 1906; Student, Cornell University, 1906-'07; Superintendent of Poultry Farm, Iowa State College, 1907-'08; Student Assistant in Poultry, *ibid.*, 1908-'10; Student, Graduate School of Agriculture, Ames, Iowa, Summer, 1910; Assistant in Charge of Poultry, Iowa State College, 1910-'11; Assistant Professor of Animal Husbandry, in Charge of Poultry, *ibid.*, 1911; President, Kansas Branch of American Poultry Association, 1913-'14; Professor of Poultry Husbandry, Kansas State Agricultural College, 1912—.

Office Ag 38; Res. 321 N. Eighteenth St.

WILBUR ANDREW COCHEL, A. B., B. S.,

Professor of Animal Husbandry.

A. B., University of Missouri, 1897; B. S., *ibid.*, 1905; Assistant in Agronomy Department, St. Louis World's Fair, 1903; in Charge of Holsteins in Dairy Test, *ibid.*, 1904; Fellow in Animal Husbandry, *ibid.*, 1905-'06; Assistant in Animal Husbandry, Purdue University, 1906-'07; Associate in Animal Husbandry, *ibid.*, 1907-'09; Professor of Animal Husbandry, Pennsylvania State College, 1909-'12; President, American Society of Animal Production, 1915-'16; Professor of Animal Husbandry, Kansas State Agricultural College, 1912—.

Office Ag 8; Res. 209 Park Road.

LELAND DAVID BUSHNELL, M. S.,

Professor of Bacteriology.

B. S., Michigan Agricultural College, 1905; M. S., University of Kansas, 1915; Assistant in Bacteriology, Michigan Agricultural College, 1906-'07; Expert in Dairy Bacteriology, Bureau of Animal Industry, University of Wisconsin, 1908-'09; Graduate Student, Harvard University, 1915-'16; Assistant in Bacteriology, Kansas State Agricultural College, 1909-'10; Instructor in Bacteriology, *ibid.*, 1910-'11; Assistant Professor in Charge of Department of Bacteriology, *ibid.*, 1911-'12; Professor of Bacteriology, *ibid.*, 1912—.

Office V 54; Res. 1414 Humboldt St.

BESSIE WEBB BIRDSALL,

Professor of Domestic Art.

Student, Drexel Institute, Philadelphia, Pa., 1900-'01; Instructor in Domestic Art, Hill School, Florence, Mass., 1901-'02; Graduate, Normal Domestic Art Course, Drexel Institute, 1903; Head of Department of Domestic Art, Winthrop State Normal and Industrial College, Rock Hill, S. C., 1903-'12; Instructor in Domestic Art, Vacation School, Buffalo, N. Y., Summer, 1906; Graduate Student, Teachers' College, Columbia University, Summers, 1911, 1912; Professor of Domestic Art, Kansas State Agricultural College, 1912—.

Office L 55; Res. 900 Leavenworth St.⁷

LELAND EVERETT CALL, M. S.,

Professor of Agronomy.

B. S. (Agr.), Ohio State University, 1906; M. S., *ibid.*, 1912; Teaching Fellow, *ibid.*, 1906-'07; Assistant in Agronomy, Kansas State Agricultural College, 1907-'08; Assistant Professor of Soils, *ibid.*, 1908-'11; Associate Professor of Soils, *ibid.*, 1911-'13; Graduate Student, Ohio State University, 1912; Professor of Agronomy, Kansas State Agricultural College, 1913—.

Office Ag 58; Res. 225 N. Fourteenth St.

6. Absent on leave, year 1916-'17.

GEORGE ADAM DEAN, M. S.,

Professor of Entomology.

B. S., Kansas State Agricultural College, 1895; M. S., *ibid.*, 1905; State Teacher's Certificate, Kansas State Normal School, 1898; Principal, Highland Park (Topeka) Public School, 1898-1902; Assistant in Entomology, Kansas State Agricultural College, 1902-'05; Instructor in Entomology, *ibid.*, 1905-'07; Assistant Professor of Entomology, *ibid.*, 1907-'12; Associate Professor of Entomology, *ibid.*, 1912-'13; Professor of Entomology, *ibid.*, 1913—.

Office F 52; Res. 327 N. Seventeenth St.

ROBERT KIRKLAND NABOURS, PH. D.,

Professor of Zoölogy; Curator of the Natural History Museum.

Ed. B., University of Chicago, 1905; Ph. D., *ibid.*, 1911; Teacher of Natural History, and Assistant Curator of the Museum, *ibid.*, 1905-'09; Graduate Student in Zoölogy, *ibid.*, 1907-'10; Instructor in Zoölogy, *ibid.*, 1909-'10; Instructor in Zoölogy, Kansas State Agricultural College, 1910-'11; Assistant Professor of Zoölogy, Kansas State Agricultural College, 1911-'13; Professor of Zoölogy, *ibid.*, 1913—.

Office F 54; Res. 1715 Fairchild Ave.

LEONARD WHITTLESEY GOSS, D. V. M.,

Professor of Pathology.

D. V. M., Ohio State University, 1905; Graduate Student, University of Michigan, Summer, 1906; Assistant in Veterinary Science, Kansas State Agricultural College, 1905-'07; Instructor in Veterinary Science, *ibid.*, 1907-'09; Graduate Student, Tierärztliche Hochschule, Berlin, Germany, 1911-'12; Graduate Student, University of Berlin, 1912; Assistant Professor of Veterinary Medicine, Kansas State Agricultural College, 1909-'13; Professor of Pathology, *ibid.*, December 1, 1913—.

Office V 58; Res. 723 Houston St.

RALPH RALPH DYKSTRA, D. V. M.,

Professor of Surgery.

D. V. M., Iowa State College, 1905; Registered Pharmacist in Iowa, 1900; Assistant Professor of Anatomy, Obstetrics, and Clinics, Iowa State College, 1905-'07; Associate Professor of Anatomy, Obstetrics, and Clinics, *ibid.*, 1907-'09; Professor of Anatomy, Obstetrics, and Clinics, *ibid.*, 1909-'11; Veterinary Inspector, U. S. Bureau of Animal Industry, Summer, 1911; Assistant Professor of Veterinary Medicine, Kansas State Agricultural College, 1911-'13; Professor of Surgery, *ibid.*, December 1, 1913—.

Office V 81; Res. 607 Houston St.

WALTER SCOTT GEARHART,¹ B. S. in C. E.,*Professor of Highway Engineering; State Engineer, Division of College Extension.*

B. S. in C. E., University of Missouri, 1907; Student, Bucknell University, 1899-1902; Chairman, United States Coal and Coke Company (West Virginia); Transitman, Pennsylvania Railroad Company (Pennsylvania) and Pere Marquette Railroad Company (Michigan); Assistant Engineer, Chicago and Alton Railroad Company (Missouri); Assistant State Highway Engineer, Illinois State Highway Commission; Highway Engineer, Division of College Extension, Kansas State Agricultural College, 1909-'11; State Engineer, *ibid.*, 1911-April 4, 1917; Professor of Highway Engineering, *ibid.*, 1914-April 4, 1917.

MARGARET HELEN HAGGART, A. M.,

Professor of Domestic Science.

B. S., Kansas State Agricultural College, 1905; A. M., Columbia University, 1914; Teacher, Topeka Public Schools, 1897-1903; Teacher, Private School of Domestic Science, Topeka, 1905-'06; Pupil Dietitian, Johns Hopkins Hospital, 1906; Professor of Home Economics, New Mexico College of Agriculture and Mechanic Arts, 1906-'10; Instructor in Dietetics, Johns Hopkins Hospital, 1910-'11; Instructor in Home Economics, Colorado Agricultural College, 1911-'13; Diploma in the Teaching of Household Arts, Teachers' College, Columbia University, 1914; Professor of Domestic Science, Kansas State Agricultural College, 1914—.

Office L 43; Res. 217 Park Road.

1. Resigned.

CLARENCE ERLE REID, B. S. in E. E.,

Professor of Electrical Engineering.

B. S. in E. E., Purdue University, 1902; Student, Rose Polytechnic Institute, 1894-'96; Teacher, Indiana Public Schools, 1896-'98; Principal, Star City (Indiana) High School, 1898-1900; in Testing Department, Bullock Electrical Manufacturing Company, Summer, 1901; Instructor in Electrical Engineering, Purdue University, 1902-'03; Research Assistant, Laboratory of National Bureau of Standards, Washington, D. C., 1903-'05; Instructor in Electrical Engineering, George Washington University, 1904-'05; Assistant Professor of Electrical Engineering, Case School of Applied Science, 1905-'09; Professor of Electrical Engineering, Mississippi Agricultural and Mechanical College, 1909-'14; Professor of Electrical Engineering, Kansas State Agricultural College, 1914—. Office C 33; Res. 421 N. Sixteenth St.

EDWARD NORRIS WENTWORTH, M. S.,

Professor of Animal Breeding.

B. S. A., Iowa State College, 1907; M. S., *ibid.*, 1909; Graduate Student, Cornell University, 1908; Graduate Student, Harvard University, 1912; Fellow in Animal Husbandry, Iowa State College, 1907; Instructor in Animal Husbandry, *ibid.*, 1908; Assistant Professor of Animal Husbandry, *ibid.*, 1909-'10; Associate Professor of Animal Husbandry, *ibid.*, 1911-'13; Assistant Superintendent of Cattle, Iowa State Fair, 1904-'12; Associate Editor, *Breeders' Gazette*, 1913-'14; Professor of Animal Breeding, Kansas State Agricultural College, 1914—. Office Ag 15 A; Res. 1421 Humboldt St.

FRANCES LANGDON BROWN, A. B., B. S.,

Director of Home Economics, Division of College Extension.

B. S., Kansas State Agricultural College, 1909; A. B., Kansas State Normal School, 1913; Graduate, Kansas State Normal School, 1898 and 1906; Teacher, Smith Center Public Schools, 1898-'99; Teacher, Madison City Schools, 1899-1900; Teacher Shorey Public Schools, 1901-'02; Teacher, Topeka City Schools, 1902-'08; Student, State Manual Training Normal, 1908; Lecturer on Domestic Science, Division of College Extension, Kansas State Agricultural College, 1909-'14; Director of Home Economics, Division of College Extension, *ibid.*, 1914—. Office A 35; Res. 514 N. Ninth St.

EDWARD CARL JOHNSON, A. M.,

Dean of the Division and Superintendent of Institutes and Demonstrations, Division of College Extension.

A. B., University of Minnesota, 1906; A. M., *ibid.*, 1907; Student Assistant in Botany, *ibid.*, 1905-'06; Instructor in Botany, *ibid.*, 1906-'07; Assistant Plant Pathologist, U. S. Department of Agriculture, 1907; Plant Pathologist, in Charge of Cereal Disease Work, *ibid.*, 1908-'12; Graduate Student, George Washington University, 1910-'11; Superintendent of Institutes and Demonstrations, Division of College Extension, Kansas State Agricultural College, 1912—; Dean of Division of College Extension, *ibid.*, 1915—. Office A 33; Res. 4 Park Road.

MICHAEL FRANCIS AHEARN, M. S.,

Professor of Landscape Gardening.

B. S., Massachusetts Agricultural College, 1904; M. S., Kansas State Agricultural College, 1913; Assistant in Horticulture, *ibid.*, 1904-'09; Head Coach in Athletics, *ibid.*, 1905-'11; Instructor in Horticulture, *ibid.*, 1909-'11; Assistant Professor of Floriculture, *ibid.*, 1911-'13; Associate Professor of Horticulture, *ibid.*, 1913-'15; Professor of Landscape Gardening, *ibid.*, 1915—. Office H 32; Res. 507 Laramie St.

NELSON ANTRIM CRAWFORD, JR., A. M.,

Professor of Industrial Journalism; Superintendent of Printing.

A. B., State University of Iowa, 1910; A. M., University of Kansas, 1914; in Newspaper Work, 1906-'09; Undergraduate Assistant in English, State University of Iowa, 1909-'10; Graduate Student, University of Kansas, 1913-'14; Assistant in English, Kansas State Agricultural College, 1910-'12; Instructor in English, *ibid.*, 1912-'13; President, Kansas Association of Teachers of English, 1913-'14; Instructor, Kansas Teachers' Institutes, 1912—; Assistant Professor of the English Language, Kansas State Agricultural College, 1913-'15; in Charge of Industrial Journalism, *ibid.*, April 1, 1914-'15; Superintendent of Printing, *ibid.*, July 1, 1915—; Professor of Industrial Journalism, *ibid.*, 1915—. Office K 52; Res. 221 N. Juliette Ave.

WILLIAM ALONZO ETHELTON, M. ARCH.,

Professor of Rural Architecture.

B. S. in Architectural Engineering, University of Illinois, 1904; M. Arch., *ibid.*, 1914; Graduate, Southern Illinois State Normal School, 1897; Superintendent, Carterville (Illinois) City Schools, 1897-1900; Contractors' Superintendent on Government Buildings, 1905-'08; Architect for Oklahoma State Board of Agriculture, and Professor of Architectural Engineering, Oklahoma Agricultural and Mechanical College, 1908-'11; Student, Massachusetts Institute of Technology, 1912; Architect in Charge of Farm Structures, U. S. Department of Agriculture, 1913-'15; Professor of Rural Architecture, Kansas State Agricultural College, 1915—.

Office A 2; Res. 512 N. Ninth St.

LAURANCE OLDHAM MATHEWS, Captain U. S. Infantry,

Professor of Military Science and Tactics; Commandant of Cadets.

Student, Kentucky State College, 1895-'96; Student, Bordentown Military Institute, 1896-'97; Instructor, U. S. Army Post Schools, Fort Leavenworth, 1900-'01; Second Lieutenant, Twenty-eighth U. S. Infantry, February, 1901-May, 1906; First Lieutenant, Sixth U. S. Infantry, May to September, 1906; First Lieutenant, Second U. S. Infantry, September, 1906-September, 1915; First Lieutenant, Fourth U. S. Infantry, 1915-'16; Captain U. S. Infantry, 1916—; Professor of Military Science and Tactics and Commandant of Cadets, Kansas State Agricultural College, 1915—.

Office N 29; Res. 325 Leavenworth St.

ARTHUR EDGAR WESBROOK, A. B., B. MUS.,

Director of Music; Professor of Voice.

A. B., Albion College, 1910; B. Mus., *ibid.*, 1911; Organizer and Conductor of Choral Society and Teacher of Vocal Music, Boise, Idaho, 1911-'14; Voice Pupil of Jans Helder, Chicago, Summer, 1912; Voice Pupil of Lemuel Kilby, Chicago, Summer, 1913; Voice Pupil of Chas. H. Bennett, Boston, Mass., 1914; Pupil in Conducting, with Wallace Goodrich, *ibid.*, 1914; Instrumentation Pupil of Louis Elson, *ibid.*, 1914; Voice Pupil of Thomas N. MacBurney, Chicago, 1915; Pupil in Coaching, with Sidney Arno Dietch, *ibid.*, 1915; Voice Pupil of Dietch, *ibid.*, 1916; Director of Music and Professor of Voice, Kansas State Agricultural College, 1915—.

Office M 30; Res. 1719 Laramie St.

JOHN ROBERTSON MACARTHUR, PH. D.,

Professor of English.

A. B., University of Manitoba, 1892; Ph. D., University of Chicago, 1903; Graduate Student, University of Manitoba, 1892-'93; Instructor in Modern Languages, Manitoba College, 1893-'97; Acting Professor of French, *ibid.*, 1897-'98; Graduate Student, University of Chicago, 1899-'03; Professor of English, New Mexico Agricultural College, 1903-'10; Agent of International Committee, Y. M. C. A., Ellis Island, N. Y., 1910-'11; Dean of the College, New Mexico Agricultural College, 1911-'13; Professor of English, *ibid.*, 1911-'13; Educational Secretary, Y. M. C. A., Sacramento, Cal., 1913-'14; Associate Professor of the English Language, Kansas State Agricultural College, 1914-April 1, 1916; Professor of English, *ibid.*, April 1, 1916—.

Office K 27; Res. 321 N. Eighteenth St.

ROSS MADISON SHERWOOD,⁴ B. S.,*Acting Professor of Poultry Husbandry;⁹ Specialist in Poultry Husbandry, Division of College Extension.*

B. S. in A. H., Iowa State College, 1910; Assistant in Poultry Husbandry, Ohio Agricultural Experiment Station, 1910-'12; Instructor in Poultry Husbandry, Iowa State College, 1912-'13; Assistant Professor of Poultry Husbandry, *ibid.*, 1913-'14; Associate Professor of Poultry Husbandry, *ibid.*, September 1-November 1, 1914; Acting Professor of Poultry Husbandry, Kansas State Agricultural College, 1916-'17; Specialist in Poultry Husbandry, Division of College Extension, *ibid.*, November 1, 1914—.

Office Ag 38; Res. 530 N. Fourteenth St.

4. In cooperation with the United States Department of Agriculture.

9. Temporary appointment.

ZORA GOODWIN CLEVINGER,*Professor of Physical Education; Director of Athletics.*

Student, Indiana University, 1900-'04; Assistant Director of Athletics, *ibid.*, 1904-'06; Graduate, Summer School of Physical Education and Athletics, Chautauqua, N. Y., 1905; Professor of Physical Education and Athletics, Nebraska Wesleyan University, 1907-'11; Physical and Athletic Director, University of Tennessee, 1911-'16; Graduate, Summer School for Athletic Coaches, University of Illinois, 1915; Professor of Physical Education and Director of Athletics, Kansas State Agricultural College, 1916—.

Office N 35; Res. 327 N. Fifteenth St.

CHARLES MOSES SIEVER, Ph. G., M. D.,*College Physician.*

Ph. G., Trinity University, 1903; M. D., *ibid.*, 1903; M. D., University of Kansas, 1907; Student, Medical Department, University of Texas, 1900-'02; in Charge of Emergency Hospital, Dallas, Texas, 1903; Associate Editor, *Journal of the Kansas Medical Society*, 1907; Student, Summer School for Health Officers, University of Kansas, 1912-'16; County Health Officer, Jackson County, 1912-'16; with Medical Corps, Kansas National Guard, 1914—; with Medical Corps, U. S. Army, Summer, 1916; College Physician, Kansas State Agricultural College, December, 1916—.

Office A 65; Res. 1323 Anderson Ave.

ASSOCIATE PROFESSORS**HARRY LLEWELLYN KENT, B. S.,***Principal of School of Agriculture; Associate Professor of Education.*

A. B., Kansas State Normal School, 1912; B. S., Kansas State Agricultural College, 1913; Graduate, Kansas State Normal School, 1904; Assistant, Science Department, *ibid.*, 1902-'04; Instructor in Science and Geography, Western State Normal School, 1904-'09; Student, University of Chicago, Summer, 1908; Special Student, Kansas State Agricultural College, Summer, 1909; Instructor in Nature Study and Elementary Agriculture, New Hampshire State Normal School, 1909-'11; Student, Cornell University, Summer, 1910; Director of Instruction by Correspondence, Division of College Extension, Kansas State Agricultural College, 1911-'13; Student, University of Chicago, Summer, 1914; Principal of School of Agriculture, and Associate Professor of Education, Kansas State Agricultural College, 1913—.

Office G 29 and 30; Res. 321 Delaware Ave.

WILLIAM HIDDLESON ANDREWS, A. B.,*Associate Professor of Mathematics.*

A. B., University of Chicago, 1900; Principal, Beloit High School, 1897-'98; Superintendent, Blue Rapids City Schools, 1901-'05; Teacher of Mathematics, Leavenworth High School, 1905-'06; Graduate Student, University of Chicago, Summer, 1911; High School Visitor, 1914-'15; Assistant in Mathematics, Kansas State Agricultural College, 1906-'07; Assistant Professor of Mathematics, *ibid.*, 1907-December 1, 1913; Principal of Sub-freshman Department, *ibid.*, 1910-'13; Associate Professor of Mathematics, *ibid.*, December 1, 1913—.

Office A 64; Res. 630 Moro St.

HERBERT HIRAM KING, A. M., M. S.,*Associate Professor of Chemistry; Associate Chemist in Engineering Experiment Station.*

A. B., Ewing College, 1904; A. M., *ibid.*, 1906; M. S., Kansas State Agricultural College, 1915; Professor of Chemistry, Manchester College, 1904-'06; Assistant in Chemistry, Kansas State Agricultural College, 1906-'08; Instructor in Chemistry, *ibid.*, 1908-'09; Graduate Student in Physical Chemistry, University of Chicago, Summer, 1909; Assistant Professor of Chemistry, Kansas State Agricultural College, 1909-'14; Associate Professor of Chemistry, *ibid.*, 1914—; Assistant Chemist, Engineering Experiment Station, *ibid.*, 1910-'14; Associate Chemist, Engineering Experiment Station, *ibid.*, 1914—.

Office C 56; Res. 916 Humboldt St.

CHARLES OSCAR SWANSON, M. AGR.,

Associate Professor of Agricultural Chemistry; Associate Chemist in Agricultural Experiment Station.

A. B., Carlton College, 1899; M. Agr., University of Minnesota, 1905; Principal, Jackson (Minn.) High School, 1899-1900; Teacher, Cannon Falls (Minn.) High School, 1900-'03; Instructor in Agricultural Chemistry and Assistant Chemist in Experiment Station, Purdue University, 1905-'06; Assistant Chemist in Agricultural Experiment Station, Kansas State Agricultural College, 1906-'14; Associate Chemist in Agricultural Experiment Station, *ibid.*, 1914—; Assistant Professor of Agricultural Chemistry, *ibid.*, 1909-'14; Associate Professor of Agricultural Chemistry, *ibid.*, 1914—. Office C 6; Res. 931 Bluemont Ave.

HARRY BRUCE WALKER,⁴ B. S. in C. E.,

Associate Professor of Irrigation and Drainage Engineering; Drainage and Irrigation Engineer, Division of College Extension.

B. S. in C. E., Iowa State College, 1910; Topographer, Chicago, Burlington and Quincy Railroad Company, 1906-'07; Student Assistant, Iowa State College, 1909-'10; Draftsman, Great Northern Railway Company, 1910; Drainage Engineer, Humboldt, Iowa, 1909-'10; Drainage and Irrigation Engineer, Division of College Extension, Kansas State Agricultural College, 1910—; Associate Professor of Irrigation and Drainage Engineering, *ibid.*, 1914—. Office A 820; Res. 1011 Osage St.

ALFRED EVERETT WHITE, M. S.,

Associate Professor of Mathematics.

B. S., Purdue University, 1904; M. S., Purdue University, 1909; Principal, Lapel (Indiana) High School, 1904-'06; Teacher, Shortridge High School, Indianapolis, Indiana, 1906-'07; Principal, Connersville (Indiana) High School, 1907-'09; Graduate Student, University of Chicago, Summer, 1905; Graduate Student, Indiana University, Summer, 1908; Assistant in Mathematics, Kansas State Agricultural College, 1909-'10; Instructor in Mathematics, *ibid.*, 1910-'12; Assistant Professor of Mathematics, *ibid.*, 1912-'14; Associate Professor of Mathematics, *ibid.*, 1914—. Office A 72; Res. 1731 Fairchild Ave.

WALTER WILLIAM CARLSON, B. S.,

Associate Professor of Shop Practice; Superintendent of Shops.

B. S., Kansas State Agricultural College, 1908; Apprentice in Machine Shops, *ibid.*, 1903-'04; Instructor in Mechanical Engineering, Montana State College, 1908-'09; Graduate Student, Armour Institute, Summer, 1909; Assistant Professor of Mechanical Engineering, Montana State College, 1909-'10; Assistant in Machine Tool Work, Kansas State Agricultural College, 1910-'11; Instructor in Machine Tool Work, *ibid.*, 1911-'12; Foreman of Machine Shop, *ibid.*, 1910-'12; Superintendent of Shops, *ibid.*, 1912—. Assistant Professor of Shop Methods and Practice, *ibid.*, 1912-'14; Associate Professor of Shop Practice, *ibid.*, 1914—. Office S 62; Res. 1130 Bluemont Ave.

EDWARD HARTMAN REISNER,¹ PH. D.,

Associate Professor of Education.

B. E., Cumberland Valley State Normal School, Shippensburg, Pennsylvania, 1901; A. B., Yale University, 1908; Larned Fellow, *ibid.*, 1908-'09; A. M., *ibid.*, 1909; Graduate Student, Columbia University, 1909-'11; Ph. D., *ibid.*, 1914; Secretary, National Society for the Promotion of Industrial Education, 1910-'11; Professor of Philosophy and Education, Washburn College, 1911-November 1, 1913; Assistant Professor of Education, Kansas State Agricultural College, November 1, 1913-'14; Acting Director of the Summer School, *ibid.*, June 15, 1916—; Associate Professor of Education, *ibid.*, 1914-'17.

SAMUEL CECIL SALMON, B. S.,

Associate Professor of Farm Crops.

B. S., South Dakota Agricultural and Mechanical College, 1907; Special Agent, U. S. Department of Agriculture, 1908-'10; Plant Physiologist, *ibid.*, 1911-'13; Assistant Professor of Farm Crops, Kansas State Agricultural College, October 1, 1913-'15; Associate Professor of Farm Crops, *ibid.*, 1915—. Office Ag 82; Res. 1630 Leavenworth St.

4. In coöperation with the United States Department of Agriculture.

1. Resigned.

IVOR VICTOR ILES., A. M.,

Associate Professor of History and Civics.

A. B., University of Kansas, 1905; A. M., *ibid.*, 1905; Graduate, Eastern Illinois State Normal School, 1901; Fellow in European History, University of Kansas, 1904-'05; Graduate Student and Assistant in History, University of Colorado, 1905-'06; Graduate Student and Assistant in European History, University of Wisconsin, 1906-'07; Instructor in History, Politics and Economics, Princeton University, 1907-'08; Harrison Fellow in American History, University of Pennsylvania, 1908-'09; Teacher of History, Anaconda (Montana) High School, 1909-'10; Instructor in History, Yale University, 1910-'11; Instructor in History and Civics, Kansas State Agricultural College, 1911-'14; Assistant Professor of History and Civics, *ibid.*, 1914-'15; Associate Professor of History and Civics, *ibid.*, 1915—.

Office F 4; Res. 1610 Leavenworth St.

JAMES BURGESS FITCH, B. S.,

Associate Professor of Dairy Husbandry.

B. S., Purdue University School of Agriculture, 1910; in Charge of Milk Supply, Children's Aid Association, Indianapolis, Ind., Summer, 1910; Assistant in Dairy Husbandry, Kansas State Agricultural College, 1910-'12; Instructor in Dairy Husbandry, *ibid.*, 1912-'14; Assistant Professor of Dairy Husbandry, *ibid.*, 1914-'15; Associate Professor of Dairy Husbandry, *ibid.*, 1915—.

Office D 30; Res. 609 N. Ninth St.

HALLAM WALKER DAVIS, A. M.,

Associate Professor of the English Language.

A. B., Indiana University, 1909; A. M., Columbia University, 1913; Principal, Poseyville (Ind.) High School, 1905-'07; Superintendent, Fort Branch (Ind.) Public Schools, 1909-'13; Graduate Student, Columbia University, Summers, 1910-'13; Instructor in the English Language, Kansas State Agricultural College, 1913-'14; Assistant Professor of the English Language, *ibid.*, 1914-'15; Associate Professor of English, *ibid.*, 1915—.

Office A 69; Res. 532 N. Fourteenth St.

ROBERT HENRY BROWN, B. M.,

Associate Professor of Music; Conductor of Orchestra.

B. M., Kansas Conservatory of Music, 1893; B. S., Kansas State Agricultural College, 1898; Graduate Student in Violin, with Bernard Listemann, 1898; Graduate Student in Violin, with Herbert Butler, Chicago, 1899, and Summer, 1916; Graduate Student in Organ and Theory, with Dr. Louis Falk, Arthur Dunham, and Edward Kreiser, 1898-'99; Graduate Student in Conducting and Instrumentation, with Adolph Weidig, 1899; Instructor in Violin and Band Instruments, Kansas State Agricultural College, 1900-'05; Assistant Professor of Music and Conductor of Orchestra, *ibid.*, 1905-'16; Associate Professor of Music, *ibid.*, 1916—.

Office M 29; Res. 331 N. Seventeenth St.

JAMES HENRY BURT, D. V. M.,

Associate Professor of Veterinary Medicine.

V. S., Ontario Veterinary College, 1895; D. V. M., Ohio State University, 1905; Private Practice, 1895-1903; Veterinary Inspector, U. S. Bureau of Animal Industry, 1905-'09; Assistant in Veterinary Medicine, Kansas State Agricultural College, 1909-'10; Graduate Student, University of Michigan, Summer, 1910; Assistant Professor of Veterinary Medicine, Kansas State Agricultural College, 1910-'16; Associate Professor of Veterinary Medicine, *ibid.*, 1916—.

Office V 32; Res. 800 Poyntz Ave.

CHARLES WILBUR McCAMPBELL, B. S., D. V. M.,

Associate Professor of Animal Husbandry.

B. S., Kansas State Agricultural College, 1906; D. V. M., *ibid.*, 1910; Assistant in Animal Husbandry, *ibid.*, 1910-'12; Secretary, Kansas State Live Stock Registry Board, 1912—; Assistant Professor of Animal Husbandry, Kansas State Agricultural College, 1912-'16; Associate Professor of Animal Husbandry, *ibid.*, 1916—.

Office Ag 5; Res. 800 Laramie St.

RAY IAMS THROCKMORTON, B. S.,

Associate Professor of Agronomy.

B. S., Pennsylvania State College, 1911; Assistant in Soil Survey (in coöperation with the United States Department of Agriculture), Kansas State Agricultural College, July, 1911-'12; Assistant in Soils, *ibid.*, February, 1912-'13; Assistant Professor of Soils, *ibid.*, 1913-'16; Associate Professor of Agronomy, *ibid.*, 1916—.

Office Ag 60; Res. 1512 Leavenworth St.

JAMES EDWARD ACKERT, PH. D.,

Associate Professor of Zoölogy; Parasitologist in Agricultural Experiment Station.

A. B., University of Illinois, 1909; A. M., *ibid.*, 1911; Ph. D., *ibid.*, 1913; Graduate, Northern Illinois State Normal School, 1903; Principal, Algonquin (Ill.) High School, 1903-'07; Graduate Assistant in Zoölogy, University of Illinois, 1909-'11; Fellow in Zoölogy, *ibid.*, 1911-'13; Graduate Student, University of Illinois, Summer, 1910; Graduate Student, Biological Station of University of Colorado, Tolland, Colo., Summer, 1910; Graduate Student (Collector), Marine Biological Station, San Diego, Cal., Summer, 1911; Professor of Vertebrate Zoölogy and Physiology, Illinois State Normal University, Summer, 1913; Instructor in Zoölogy, University of Washington (one month), 1913; Parasitologist in Agricultural Experiment Station, Kansas State Agricultural College, 1913; Assistant Professor of Zoölogy, *ibid.*, 1913-'16; Associate Professor of Zoölogy, *ibid.*, 1916—.

Office F 58; Res. 1422 Poyntz Ave.

PAUL SMITH WELCH, PH. D.,

Associate Professor of Entomology.

A. B., James Millikin University, 1910; A. M., University of Illinois, 1911; Ph. D., *ibid.*, 1913; Assistant in Biology, James Millikin University, 1909-'10; Assistant Curator, William Barnes Lepidoptera Collection, 1906-'10; Fellow in Zoölogy, University of Illinois, 1911-'13; Instructor in Entomology, University of Michigan Biological Station, Summers, 1911, 1912, and 1913; Instructor in Entomology, and Assistant Entomologist in Agricultural Experiment Station, Kansas State Agricultural College, 1913-'14; Assistant Professor of Entomology, *ibid.*, 1914-'16; Associate Professor of Entomology, *ibid.*, 1916—.

Office F 64A; Res. 1621 Anderson Ave.

GEORGE SHERWOOD HINE, B. S. A.,

State Dairy Commissioner.

B. S. A., University of Wisconsin, 1907; Student Instructor in Farm Engineering, *ibid.*, 1907; Assistant in Feed and Fertilizer Inspection and Dairy Tests, *ibid.*, 1907-'08; Principal, Marinette (Wis.) County School of Agriculture and Domestic Economy, 1909; Lecturer on Dairying, Division of College Extension, Kansas State Agricultural College, 1910-'12; State Dairy Commissioner, 1912—.

Office X 26; Res. 307 N. Sixteenth St.

WALTER HORACE BURR,

Director of Rural Service, Division of College Extension.

Student, Knox College, 1897-1902; Student, University of California, 1904-'05; Student, Pacific Theological Seminary, 1904-'05; Instructor in Expression, *ibid.*, 1904-'05; Assistant Director of Rural Service, Division of College Extension, Kansas State Agricultural College, May 15, 1914-'15; Director of Rural Service, Division of College Extension, *ibid.*, July 1, 1915—.

Office A 37; Res. 105 S. Juliette Ave.

CHARLES ROZELL WEEKS, B. S., B. Ed.,

Superintendent, Fort Hays Branch Agricultural Experiment Station.

B. S., University of Nebraska, 1907; B. Ed., Peru (Nebr.) State Normal School, 1912; Rural School Teacher, 1897-1900; High School Principal, 1902-'05; Student Assistant in Dairy Husbandry, University of Nebraska, 1906-'07; Superintendent, Fairmount (Nebr.) City Schools, 1907-'09; Professor of Agriculture, Peru (Nebr.) State Normal School, 1909-'12; Instructor in Agriculture, Nebraska Normal Institutes, Summers, 1910-'12; Professor of Agriculture, Farm Inspector, and Director of Extension Work, Winthrop Normal and Industrial College, Rock Hill, S. C., 1912-'16; Superintendent, Fort Hays Branch Agricultural Experiment Station, Kansas State Agricultural College, March 15, 1916—.

Office and Res., Hays, Kan.

ASSISTANT PROFESSORS

GEORGE EBEN BRAY, M. E.,

Industrial Engineer, Division of College Extension.

M. E., University of Minnesota, 1894; Instructor in Manual Training, Logan High School, Minneapolis, Minn., 1897-'98; Supervisor of Manual Training, Superior (Wis.) Public Schools, 1900-'03; Graduate Student, Columbia University, Summer, 1902; Graduate Student, University of Minnesota, Summer, 1903; Director of Mechanical Drawing and Manual Arts, New Trier Township High School, Kenilworth, Ill., 1903-'09; Assistant Professor of Mechanical Engineering, Kansas State Agricultural College, 1909-'10; Superintendent of Shops, *ibid.*, 1909-'12; Assistant Professor of Shop Methods and Practice, *ibid.*, 1910-'12; Industrial Engineer, Division of College Extension, *ibid.*, 1912—.

Office A 5; Res. 817 Osage St.

WILMER ESLA DAVIS, A. B.,

Assistant Professor of Botany.

A. B., University of Illinois, 1903; Graduate, Ohio Normal University, 1894; Public School Work, 1894-1900; Principal, Rossville (Ill.) High School, 1903-'04; Instructor, Great Falls (Mont.) High School, 1904-'05; Instructor in Science, Urbana (Ill.) High School, 1905-'08; Graduate Student in Botany, University of Chicago, 1908-'09, and Summers, 1908, 1909, and 1910; Assistant Professor of Botany, Kansas State Agricultural College, 1909—.

Office H 57; Res. 1209 Vattier St.

GEORGE OGDEN GREENE, M. S.,

Specialist in Horticulture, Division of College Extension.

B. S., Kansas State Agricultural College, 1900; M. S., *ibid.*, 1902; Assistant in Horticulture, *ibid.*, 1901-'03; Assistant in Horticulture, Massachusetts Agricultural College, 1903-'05; with Worley and Greene, Merchants, 1905-'10; Specialist in Horticulture, Division of College Extension, Kansas State Agricultural College, 1912—.

Office A 36; Res. 917 Fremont St.

ALVIN SCOTT NEALE, B. S. A.,

Assistant Superintendent of Institutes and Specialist in Dairy Husbandry, Division of College Extension.

B. S. A., Ohio State University, 1904; Superintendent of Farm, *ibid.*, 1903-'04; Agricultural Correspondent, Scripps-McRea League of Newspapers, 1904-'07; Dairy Lecturer, Agricultural-Extension Department, Ohio State University, 1908-'13; Specialist in Dairy Husbandry, Division of College Extension, Kansas State Agricultural College, January 1, 1913—; Assistant Superintendent of Farmers' Institutes, Division of College Extension, *ibid.*, 1913—.

Office A 34; Res. 1646 Fairchild Ave.

PORTER JOSEPH NEWMAN, M. S.,

Assistant Professor of Chemistry.

B. S., Franklin College, 1908; M. S., *ibid.*, 1910; Assistant in Chemistry, *ibid.*, 1907-'08; Assistant Chemist, Indianapolis Board of Health, 1907-'08; Graduate Student, University of Chicago, Summers, 1909 and 1915; Graduate Student, University of Wisconsin, Summer, 1916; Assistant in Chemistry, Kansas State Agricultural College, 1909-'10; Instructor in Chemistry, *ibid.*, 1910-'13; Assistant Professor of Chemistry, *ibid.*, 1913—.

Office C 64; Res. 914 Leavenworth St.

JOSIAH SIMSON HUGHES, M. S.,

Assistant Professor of Chemistry.

B. S., Ohio Wesleyan University, 1908; M. S., *ibid.*, 1909; Instructor, *ibid.*, 1908-'09; Fellow, Ohio State University, 1909-'10; A. M., *ibid.*, 1910; Assistant in Chemistry, Kansas State Agricultural College, 1910-'12; Instructor in Chemistry, *ibid.*, 1912-'13; Assistant Professor of Chemistry, *ibid.*, 1913—.

Office C 41; Res. 607 Vattier St.

GRACE EMILY DERBY, A. B.,

Assistant Librarian.

A. B., Western College for Women, Oxford, Ohio, 1905; Graduate Student, Illinois State Library School, 1905-'06; Reference Assistant in Library, University of Illinois, 1906-'07; Librarian, Western College for Women, 1907-'11; Reference Librarian, Kansas State Agricultural College, 1911-'13; Assistant Librarian, *ibid.*, 1913—.

Office F 32; Res. 1633 Fairchild Ave.

HOWARD W. BRUBAKER, PH. D.,*Assistant Professor of Chemistry.*

B. S., Carleton College, 1899; Ph. D., University of Pennsylvania, 1904; Professor of Chemistry, Whitman College, 1904-'11; Honorary Fellow, Cornell University, 1911-'12; Instructor in Physical Chemistry and Electrochemistry, Carnegie Institute of Technology, 1912-'13; Assistant Professor of Chemistry, Kansas State Agricultural College, 1913—.

Office W 27; Res. 1116 Fremont St.

INA FOOTE COWLES, B. S.,*Assistant Professor of Domestic Art.*

B. S., Kansas State Agricultural College, 1901; Graduate Student, Teachers' College, Columbia University, 1905-'06; Graduate Student, University of Kansas, 1915-'16; Assistant in Domestic Art, Kansas State Agricultural College, 1902-'05 and 1906-'09; Graduate Student, Stout Institute, Menomonie, Wis., Summer, 1913; Instructor in Domestic Art, Kansas State Agricultural College, 1909-'14; Assistant Professor of Domestic Art, *ibid.*, 1914—.

Office L 56; Res. 1026 Houston St.

RAYMOND GARFIELD TAYLOR,⁶ A. M.,*Assistant Professor of History and Civics.*

A. B., University of Kansas, 1907; A. M., University of Chicago, 1915; Student in Law Office, Summers, 1905-'08; Principal and Teacher of History, Hiawatha High School, 1907-'10; Graduate Student, University of Kansas, Summer, 1909; Graduate Student, University of Chicago, Summers, 1911, 1914, and 1915; Graduate Student, Yale University, 1916-'17; Instructor in History and Civics, Kansas State Agricultural College, 1910-'14; Assistant Professor of History and Civics, *ibid.*, 1914—.

Office F 4; Res. 1610 Leavenworth St.

EUSTACE VIVIAN FLOYD, B. S.,*Assistant Professor of Physics.*

B. S., Earlham College, 1903; Instructor in Chemistry, Westtown School, Philadelphia, Pa., 1903-'05; Professor of Physics, Guilford College, 1905-'09; Graduate Student and Assistant in Physics, University of Chicago, 1909-'11; Instructor in Physics, Kansas State Agricultural College, 1911-'14; Assistant Professor of Physics, *ibid.*, 1914—.

Office C 57; Res. 1451 Laramie St.

HARRISON ELEAZER PORTER, B. S.,*Assistant Professor of Mathematics.*

B. S., Kansas State Agricultural College, 1907; with Engineering Department, Santa Fe Railway, Summer, 1907; Graduate Student, Harvard University, Summer, 1910; Graduate Student, Columbia University, Summer, 1911; Assistant in Mathematics, Kansas State Agricultural College, 1908-'12; Instructor in Mathematics, *ibid.*, 1912-'14; Assistant Professor of Mathematics, *ibid.*, 1914—.

Office A 70; Res. 1024 Houston St.

WILLIAM TIMOTHY STRATTON, A. M.,*Assistant Professor of Mathematics.*

A. B., Indiana University, 1906; A. M., University of Indiana, 1913; Superintendent, Oneida (Ill.) Public Schools, 1906-'07; Principal, McCray-Dewey Academy, Troy, Ill., 1907-'10; Instructor, Kansas Teachers' Institute, 1911-'13; Assistant in Mathematics, Kansas State Agricultural College, 1910-'12; Instructor in Mathematics, *ibid.*, 1912-'14; Assistant Professor of Mathematics, *ibid.*, 1914—.

Office G 33; Res. 1020 Vattier St.

OLIVER WILLIAM HUNTER, M. S.,*Assistant Professor of Bacteriology.*

B. S., Kansas State Agricultural College, 1909; M. S., University of Wisconsin, 1911; Student Assistant and Graduate Student in Bacteriology, *ibid.*, 1909-'10; Assistant in Bacteriology, Kansas State Agricultural College, 1911-'12; Instructor in Bacteriology, *ibid.*, 1912-'14; Assistant Professor of Bacteriology, *ibid.*, 1914—.

Office V 52; Res. 901 Osage St.

6. Absent on leave, 1916-'17.

MARY THERESA HARMAN, PH. D.,

Assistant Professor of Zoölogy.

A. B., University of Indiana, 1907; A. M., *ibid.*, 1909; Ph. D., *ibid.*, 1912; Student Assistant in Botany and Zoölogy, Indiana State Normal School, 1903-'04; Graduate, *ibid.*, 1904; Teaching Fellow, Biological Station Indiana University, Summer, 1905; Instructor in Embryology and Histology, *ibid.*, Summers, 1906-'09, 1911, 1912; Instructor in Zoölogy, Pennsylvania State College, 1907-'10; Teaching Fellow in Zoölogy, Indiana University, 1910-'12; Instructor in Zoölogy, Kansas State Agricultural College, 1912-'14; Assistant Professor of Zoölogy, *ibid.*, 1914—.

Office F 61; Res. 1430 Poyntz Ave.

CLAUDE M. VESTAL, B. S. A.,

Assistant Professor of Animal Husbandry.

B. S. A., Purdue University, 1911; Assistant in Agricultural Extension, *ibid.*, 1911-'12; Instructor in Animal Husbandry, Kansas State Agricultural College, 1912-'14; Assistant Professor of Animal Husbandry, *ibid.*, 1914—.

Office Ag 7; Res. 1809 Leavenworth St.

THOMAS POWELL HASLAM,¹ M. S.,*Assistant Professor of Veterinary Medicine.*

B. S., Kansas State Agricultural College, 1908; M. S., *ibid.*, 1910; Assistant Instructor in Chemistry, University of Kansas, 1908-'09; Assistant in Veterinary Medicine, Agricultural Experiment Station, Kansas State Agricultural College, 1909-'14; Assistant Professor of Veterinary Medicine, *ibid.*, 1914 - Feb. 1, 1917.

GEORGE ELLSWORTH RABURN, M. S.,

Assistant Professor of Physics.

A. B., University of Michigan, 1907; M. S., *ibid.*, 1913; Graduate, Kansas State Normal School, 1905; Graduate Student, University of Michigan, 1912-'13; Assistant in Physics, Kansas State Agricultural College, 1910-'14; Assistant Professor of Physics, *ibid.*, 1914—.

Office C 61; Res. 1014 Bluemont Ave.

EDGAR LEMUEL TAGUE, A. M.,

Assistant Professor of Chemistry; Assistant in Protein Chemistry, Agricultural Experiment Station.

A. B., University of Kansas, 1908; A. M., *ibid.*, 1909; Research Fellow in Chemistry, *ibid.*, 1909-'10; Assistant Professor of Chemistry, *ibid.*, 1910-'11; Professor of Chemistry, Washburn College, 1911-'14; Assistant Professor of Chemistry, Agricultural Experiment Station, Kansas State Agricultural College, 1914—.

Office C 3; Res. one block west of Campus.

WALDO ERNEST GRIMES, B. S.,

Assistant Professor of Farm Management.

B. S., Kansas State Agricultural College, 1913; Farm Foreman, *ibid.*, 1913-'14; Graduate Student, Cornell University, Fall, 1914; Assistant Professor of Farm Management, Kansas State Agricultural College, January 1, 1915—.

Office Ag 60; Res. 1729 Fairchild Ave.

HARRY UMBERGER, B. S.,

Supervisor of Demonstrations, Division of College of Extension.

B. S., Kansas State Agricultural College, 1905; Scientific Assistant, Bureau of Soils, U. S. Department of Agriculture, 1906; Scientific Assistant, Bureau of Plant Industry, *ibid.*, 1907-'11; Assistant Professor in Charge of Coöperative Experiments, Kansas State Agricultural College, 1911-'12; Farmer, Chase County, Kansas, 1912-'15; Supervisor of Demonstrations, Division of College Extension, Kansas State Agricultural College, 1915—.

Office A 33; Res. 1022 Fremont St.

¹. Resigned.

ADA RICE, M. S.,

Assistant Professor of English; Assistant Principal of School of Agriculture.

B. S., Kansas State Agricultural College, 1895; M. S., *ibid.*, 1912; Assistant in English, *ibid.*, 1899-1905; Life Teacher's Certificate for Kansas, 1900; Graduate Student, University of Chicago, 1902; Graduate Student, Harvard University Summer School, 1905; Instructor in English, Kansas State Agricultural College, 1905-'11; Instructor in the English Language, *ibid.*, 1911-'15; Assistant Professor of English, *ibid.*, 1915—; Assistant Principal of the School of Agriculture, *ibid.*, 1913—. Office G 28; Res. 917 Osage St.

ESTELLA MAY BOOT, A. M.,

Assistant Professor of English.

A. B., University of South Dakota, 1901; A. M., Northwestern University, 1909; Teacher in Public Schools, Hartley, Iowa, 1897-'98; Teacher of English and Latin, Cherokee (Iowa) High School, 1901-'06; Principal, *ibid.*, 1906-'08; Graduate Student, State University of Iowa, Summers, 1905 and 1915; Instructor in Summer School and Institute, Cherokee County, Iowa, 1907-'08; Assistant in English, Kansas State Agricultural College, 1909-'11; Graduate Student, Columbia University, Summers, 1912 and 1913; Instructor in English, Kirksville (Mo.) State Normal School, Summer, 1914; Instructor in the English Language, Kansas State Agricultural College, 1911-'15; Assistant Professor of English, *ibid.*, 1915—. Office K 58; Res. 532 N. Fourteenth St.

EDWIN CYRUS MILLER, PH. D.,

Assistant Professor of Botany.

A. B., Lebanon College, 1906; A. B., Yale University, 1907; Ph. D., *ibid.*, 1910; Graduate Student, *ibid.*, 1907-'10; Assistant in Botany, Kansas State Agricultural College, 1910-'11; Instructor in Botany, *ibid.*, 1911-'15; Assistant Professor of Botany, *ibid.*, 1915—. Office H 56; Res. 813 Moro St.

ELDEN VALORIUS JAMES, A. M.,

Assistant Professor of History and Civics.

A. B., Marietta College, 1901; A. B., University of Michigan, 1905; A. M., Marietta College, 1908; Principal, Caywood (Ohio) Public Schools, 1895-'97 and 1901-'02; Assistant Principal, Williamstown (W. Va.) High School, 1902-'04; Head of Department of History, Monmouth (Ill.) High School, 1905-'06; Principal, West Palm Beach (Fla.) High School, 1906-'08; Instructor in History, Marietta College, Summers, 1902, '03, '08, '10; Professor of History and Economics, West Virginia Wesleyan College, 1908-'09; Head of Department of History, Wichita High School, 1909-'11; Vice Principal, *ibid.*, 1911-'12; Instructor, Barber County Normal Institute, 1912; Graduate Student, University of Michigan, Summer, 1916; Instructor in History and Civics, Kansas State Agricultural College, 1912-'15; Assistant Professor of History and Civics, *ibid.*, 1915—. Office F 1; Res. 621 Humboldt St.

JOSEPH HENRY MERRILL, PH. D.,

Assistant Professor of Entomology; Assistant Entomologist, Agricultural Experiment Station.

B. S., Dartmouth College, 1905; Ph. D., Massachusetts Agricultural College, 1914; on Insect Pest Suppression Work, Massachusetts, 1905-'08; Graduate Student in Entomology, Massachusetts Agricultural College, 1909-'11; Deputy State Nursery Inspector, Massachusetts, 1910-'11; Assistant Entomologist, Agricultural Experiment Station, Kansas State Agricultural College, 1912—; Instructor in Entomology, *ibid.*, 1912-'15; Assistant Professor of Entomology, *ibid.*, 1915—. Office F 52; Res. 626 Moro St.

SIEBELT LUKE SIMMERING, M. S., M. E.,

Assistant Professor of Steam and Gas Engineering.

B. S., University of Colorado, 1910; M. S., University of Illinois, 1913; M. E., University of Colorado, 1916; Student Assistant in Physics, *ibid.*, 1908-'09; Assistant Instructor in Shop Practice, *ibid.*, 1909-'10; Instructor and Graduate Student of Mechanical Engineering, *ibid.*, 1910-'12; Graduate Fellow in Mechanical Engineering, University of Illinois, 1912-'13; Instructor in Industrial Engineering, Pennsylvania State College, 1913-'14; Instructor in Steam and Gas Engineering, Kansas State Agricultural College, March 11, 1914-'15; Assistant Professor of Steam and Gas Engineering, *ibid.*, 1915—. Office S 55; Res. 1725 Anderson Ave.

FORREST FAYE FRAZIER, C. E.,

Assistant Professor of Civil Engineering.

C. E., Ohio State University, 1910; Student, Liberal Arts, Miami University, 1905-'07; Student, Engineering Course, Ohio State University, 1907-'10; Assistant in Engineering Corps, Cincinnati, Hamilton and Dayton Railway, Summer, 1909; Inspector of Concrete Bridges, *ibid.*, 1910; Assistant Superintendent on Excavation and Fill, with Railroad Contractors, 1910-'11; Assistant Engineer on Construction, Pennsylvania Railway, 1911; Assistant in Civil Engineering, Kansas State Agricultural College, 1911-'14; Instructor in Civil Engineering, *ibid.*, 1914-'15; Assistant Professor of Civil Engineering, *ibid.*, 1915—.

Office E 55; Res. 915 Fremont St.

RALPH KENNEY, B. S. A.,

Assistant Professor of Crops.

B. S. A., Ohio State University, 1912; Assistant in Agronomy, Kentucky State College of Agriculture, and Experiment Station, 1912 - December 31, 1913; Assistant in Farm Crops, Kansas State Agricultural College, Jan. 1, 1914 - Sept. 1, 1914; Instructor in Farm Crops, *ibid.*, 1914-'15; Assistant Professor of Crops, *ibid.*, 1915—.

Office Ag 82; Res. 1412 Leavenworth St.

CLAUDE CARROLL CUNNINGHAM, B. S.,

Assistant Professor of Coöperative Experiments.

B. S., Kansas State Agricultural College, 1903; Graduate Student, *ibid.*, 1904; Graduate Student, Cornell University, 1906; Special Assistant in Agronomy, Kansas State Agricultural College, 1907-'08; Assistant in Agronomy, Fort Hays Branch Experiment Station, *ibid.*, 1908-'11; Assistant in Coöperative Experiments, *ibid.*, 1912-'15; Assistant Professor of Coöperative Experiments, *ibid.*, 1915—.

Office Ag 59; Res. 1018 Laramie St.

MYRON GARFIELD BURTON, A. B.,

Director of Home Study Service, Division of College Extension.

A. B., Muncie (Ind.) Normal Institute, 1913; Instructor, Washington Township Public School, Ind., 1899-1902; Student, Indiana University, 1902-'03, and Summers, 1903, '04, '05; Principal, Aroma (Ind.) Graded Schools, 1903-'04; Principal, White River Township Consolidated High School, Ind., 1904-'10; Superintendent, Plano (Ill.) City Schools, 1910-'12; Editor-in-Chief, National Manual Training Publishing Company, 1911-'13; Director of Extension Department, Muncie (Ind.) Normal Institute, 1912-'15; Director of Home Study Service, Division of College Extension, Kansas State Agricultural College, 1915—.

Office A 4; Res. 1106 Laramie St.

ROBERT WARREN CONOVER, A. M.,

Assistant Professor of English.

A. B., Wesleyan University, 1911; A. M., *ibid.*, 1914; Student, Drew Theological Seminary, 1911-'12; Graduate Student, Columbia University, Summer, 1913; Graduate Student, University of Pennsylvania, Summers, 1915 and 1916; Instructor in English, Pennsylvania State College, 1912-'15; Secretary of School of Liberal Arts, *ibid.*, 1913-'15; Assistant Professor of English, Kansas State Agricultural College, 1915—.

Office A 53; Res. 1709 Laramie St.

HELEN HAY HALM,¹⁰ B. S.,*Assistant Professor of Home Economics and Education.*

B. S., Kansas State Agricultural College, 1908; B. S., Columbia University, 1915; Director of Domestic Science and Art Department, Corsicana (Texas) High School, 1908-'10; Director of Home Economics Department, Southwest Texas State Normal School, 1910-'13; Student, Columbia University, Summer, 1912; Director of Two-year Home Economics Department, Iowa State College, 1913-'14; Diploma in Household Arts, Teachers' College, Columbia University, 1915; Assistant Professor of Home Economics and Education, Kansas State Agricultural College, 1915—.

Office L 41; Res. 1612 Laramie St.

10. Absent on leave January 1 to September 1, 1917.

NOLA TREAT, B. S.,

Assistant Professor of Domestic Science; Director of Cafeteria.

B. S., Columbia University, 1915; Diploma in Home Economics, Rockford College, 1908; Assistant Director of Cafeteria, Y. W. C. A., Elgin, Ill., 1908-'09; Director of Cafeteria, Emerson-Brantingham Company, Rockford, Ill., 1909-'11; Director of Public School Lunch Rooms, Decatur, Ill., 1911-'14; Diploma in Household Arts, Teachers' College, Columbia University, 1915; Assistant Professor of Domestic Science and Director of Cafeteria, Kansas State Agricultural College, 1915—.

Office K 29; Res. 1612 Laramie St.

MALCOLM C. SEWELL, M. S.,

Assistant Professor of Soils.

B. S., Kansas State Agricultural College, 1912; M. S., Ohio State University, January 1, 1914; Superintendent, Garden City Branch Agricultural Experiment Station, March 1, 1914-'15; Assistant Professor of Soils, Kansas State Agricultural College, December 1, 1915—.

Office Ag 60; Res. 617 Houston St.

MYRON RALPH BOWERMAN,¹ M. E.,

Assistant Professor of Applied Mechanics and Machine Design.

B. S., Michigan Agricultural College, 1909; M. E., *ibid.*, 1914; Draftsman, Western Electric Company, Summer, 1909; Assistant in Mechanical Engineering, Kansas State Agricultural College, 1909-'10; Draftsman, Capital Iron Works, Topeka, 1910-'11; Draftsman, Phillips, Long and Company, Chicago, Ill., 1911; Draftsman, Hanke Iron Works, *ibid.*, 1911-'12; Assistant in Mechanical Drawing and Machine Design, Kansas State Agricultural College, 1912-'14; Instructor in Mechanical Drawing and Machine Design, *ibid.*, 1914-'16; Assistant Professor of Applied Mechanics and Machine Design, *ibid.*, 1916-March 1, 1917.

FREDERICK ALFRED WIRT, B. S.,

Assistant Professor of Farm Machinery, in Charge.

B. S., University of Nebraska, 1913; Student Assistant in Applied Mechanics, *ibid.*, 1912-'13; Assistant in Farm Mechanics, Kansas State Agricultural College, July 1, 1913-'14; Instructor in Farm Mechanics, *ibid.*, 1914-'15; Instructor in Charge of Department of Farm Machinery, *ibid.*, July 1, 1915-'16; Assistant Professor in Charge of Farm Machinery, *ibid.*, 1916—.

Office R 27; Res. 1621 Anderson Ave.

ARAMINTA HOLMAN,

Assistant Professor of Home Art, in Charge.

Graduate, Kansas State Normal School, 1890; Instructor, Leavenworth Public Schools, 1891-1904; Principal, *ibid.*, 1904-'09; Art Instructor, Leavenworth County Institute, 1901, 1904; Graduate, New York School of Fine and Applied Art, 1910; Instructor, *ibid.*, 1910-'11; Instructor in Art, Kansas State Normal School, Summer, 1910, and Spring Term, 1913; Instructor in Art, State-Wide Institute, *ibid.*, 1913; Assistant in Drawing, Kansas State Agricultural College, 1913-'14; Instructor in Drawing, *ibid.*, 1914-'15; Instructor in Home Art, *ibid.*, 1915-'16; Assistant Professor in Charge of Home Art, *ibid.*, 1916—.

Office A 67; Res. 1612 Laramie St.

OLIVE AMY SHEETS,¹² M. S.,

Assistant Professor of Domestic Science.

A. B., Ohio State University, 1908; B. S., *ibid.*, 1910; M. S., University of Wisconsin, 1914; Instructor in Home Economics, Iowa State Teachers' College, 1912-'13; Instructor in Domestic Science, Kansas State Agricultural College, 1914-'16; Assistant Professor of Domestic Science, *ibid.*, 1916—.

Office L 35; Res. 421 N. Sixteenth St.

1. Resigned.

12. Absent on leave, February 1 to June 21, 1917.

FRED SAWYER MERRILL, B. S.,

Assistant Professor of Horticulture.

B. S., Massachusetts Agricultural College, 1912; Assistant in Horticulture, Extension Department, *ibid.*, 1911-'12; Assistant to State Entomologist, Kansas State Entomological Commission, 1912-'13; Horticulturist, Division of College Extension, Kansas State Agricultural College, March 1 to May 15, 1913; Assistant in Horticulture, *ibid.*, 1913-'15; Instructor in Horticulture, *ibid.*, 1915-'16; Assistant Professor of Horticulture, *ibid.*, 1916—.

Office H 32; Res. 504 Laramie St.

JAMES GORDON EMERSON, J. D.,

Assistant Professor of Public Speaking, in Charge.

B. S., Iowa State College, 1912; J. D., School of Law, Leland Stanford University, 1915; Student, Harvard University Law School, 1912-'13; Graduate Student, University of California, Summer School, 1914; Instructor in Charge of Public Speaking, Kansas State Agricultural College, 1915-'16; Assistant Professor in Charge of Public Speaking, *ibid.*, 1916—.

Office G 56; Res. 1615 Anderson Ave.

ALBERT GARLAND HOGAN, PH. D.,

Assistant Professor of Chemistry, Agricultural Experiment Station.

A. B., University of Missouri, 1907; B. S., *ibid.*, 1909; A. M., University of Missouri, 1912; Ph. D., Yale University, 1914; Instructor in Chemistry, Northwest Missouri Normal School, 1909-'11; Fellow in Agricultural Chemistry, University of Missouri, 1911-'12; Fellow in Physiological Chemistry, Yale University, 1912-'13; Assistant in Physiological Chemistry, *ibid.*, 1913-'14; Assistant in Animal Nutrition, Agricultural Experiment Station, Kansas State Agricultural College, July 15, 1914-'16; Assistant Professor of Chemistry, Agricultural Experiment Station, *ibid.*, 1916—.

Office C 8; Res. 1615 Anderson Ave.

MAURICE COLE TANQUARY, PH. D.,

Assistant Professor of Entomology; Assistant Entomologist, Agricultural Experiment Station.

A. B., University of Illinois, 1907; A. M., *ibid.*, 1908; Ph. D., *ibid.*, 1912; Assistant in Entomology and Zoölogy, *ibid.*, 1907-'09; Assistant to Illinois State Entomologist, 1907-'09; Assistant in Entomology, University of Illinois, 1909-'12; Graduate Student, Bussey Institution, Harvard University, Summer, 1910; Assistant to Minnesota State Entomologist, Summer, 1911; Zoölogist, Crockerland Expedition, 1913-'16; Instructor in Entomology, Kansas State Agricultural College, 1912-'15; Assistant Professor of Entomology, *ibid.*, 1916—; Assistant Entomologist, Agricultural Experiment Station, *ibid.*, 1912-'15, 1916—.

Office F 62; Res. R. F. D. 1.

EMERY ANDREW BAUER, B. S., B. P. E.,

Assistant Professor of Physical Education for Men.

B. S., Colgate University, 1902; B. P. E., International Y. M. C. A. College, Springfield, Mass., 1908; Instructor in Sciences and Director of Athletics, Hornell (N. Y.) High School, 1902-'04; Graduate Student, Syracuse University, Summer, 1904; Instructor in Modern Languages and Track Coach, Pillsbury Academy, N. Y., 1904-'05; Physical Director, Elmira (N. Y.) Y. M. C. A., 1908-'09; Assistant Physical Director, Ohio State University, 1909-'12; Graduate Student, Summer School of Physical Education, Harvard University, 1912; Director of Physical Education, College of Wooster, 1912-'13; Professor of Physical Education, *ibid.*, 1913-'16; Assistant Professor of Physical Education for Men, Kansas State Agricultural College, 1916—.

Office N 37; Res. 343 N. Fifteenth St.

ANNIE ROWLAND CAHOON,¹ PH. B., M. S.,

Assistant Professor of Physical Education for Women.

Ph. B., Milwaukee-Downer College, 1912; M. S., University of Wisconsin, 1915; Director of Physical Education, Y. W. C. A. and Girls' High School, Riverside, Cal., 1915-'16; Assistant Professor of Physical Education for Women, Kansas State Agricultural College, 1916-'17.

1. Resigned.

CHARLES FRANCIS DUNN,⁹ A. M.,*Assistant Professor of Education.*

B. S., Lebanon University, Lebanon, Ohio, 1910; A. B., Kentucky State University, 1911; A. M., University of Chicago, 1916; Graduate Student and Fellow in Education, *ibid.*, 1918-'15; Research Assistant in Education, *ibid.*, 1915-'16; Teacher in Public Schools, Kentucky, 1906-'09; Principal, Cold Springs (Ky.) Graded School, 1909-'10; Principal, Carroll County (Ky.) High School, April, 1911-'12; Teacher, Cincinnati, Ohio, 1912-'13; Assistant Professor of Education, Kansas State Agricultural College, 1916-'17.

ROYCE GERALD KLOEFFLER,⁹ B. S.,*Assistant Professor of Electrical Engineering.*

B. S. in Electrical Engineering, University of Michigan, 1913; with Testing Department, General Electric Company, July, 1913-'14; with Educational Department, *ibid.*, 1914-July, 1915; Teacher in Evening School, General Electric Company, Pittsfield, Mass., 1913-'15; Substation Designing, Detroit Edison Company, Summer, 1915; Instructor in Electrical and Mechanical Engineering, University of Idaho, 1915-'16; with Commercial Department, Washington Water Power Company, Summer, 1916; Assistant Professor of Electrical Engineering, Kansas State Agricultural College, 1916-'17.

ARTHUR FREDERICK PEINE,⁹ A. M.,*Assistant Professor of History and Civics.*

A. B., Illinois Wesleyan University, 1911; A. M., University of Illinois, 1913; Scholar in History, *ibid.*, 1911-'12; Fellow in History, *ibid.*, 1912-'14; Graduate Student, University of Chicago, Summers, 1912, '13, '16; Instructor in History, Wayland Academy, Beaver Dam, Wis., 1914-'15; Assistant Professor of History, Economics and Government, Fairmount College, 1915-'16; Assistant Professor of History and Civics, Kansas State Agricultural College, 1916-'17.

ADOLPH GEORGE SCHULZ,

Assistant Professor of Athletics and Assistant Coach.

Student, University of Michigan, 1904-'08; Head Line Coach in Football, University of Wisconsin, 1911 and '12; Head Line Coach in Football, University of Michigan, 1913, '14, and '15; Assistant Professor of Athletics and Assistant Coach, Kansas State Agricultural College, 1916—.

Office N 35; Res. 308 N. Sixteenth St.

WYLIE BRODBECK WENDT, B. C. E.,

Assistant Professor of Applied Mechanics.

B. C. E., University of Kentucky, 1906; on Topographic Survey, Paris, Ky., 1905; Assistant Engineer, Zeigler (Ill.) Coal Co., Summer, 1906; Instructor in Civil Engineering, Michigan Agricultural College, 1906-'10; Assistant Professor of Civil Engineering, *ibid.*, 1910-'15; in Charge of Forest Topography, Forestry Camp, *ibid.*, Summers, 1909-'13; City Engineer, East Lansing, Mich., 1910-'12; Highway Engineer, Kentucky State Department of Public Roads, 1915; Superintendent of Highway Construction, City of Fort Thomas, Ky., 1916; Assistant Professor of Applied Mechanics, Kansas State Agricultural College, 1916—.

Office E 8A; Res. 1330 Fremont St.

CLINTON ELLICOTT PEARCE, S. B.,

Assistant Professor of Applied Mechanics and Machine Design.

S. B., Massachusetts Institute of Technology, 1913; Draftsman with John DeWolf; Extension, *ibid.*, 1911-'12; Graduate Student, *ibid.*, 1912-Feb. 1913; Graduate Student, Lafayette College, 1913-February, 1917; with Steam Turbine Department, Westinghouse Machine Co., Summer, 1916; Acting Director of Mechanical Engineering Department, Lafayette College, November, 1916-February, 1917; Assistant Professor of Applied Mechanics and Machine Design, Kansas State Agricultural College, March 26, 1917—.

Office S 63; Res. 615 N. Eleventh St.

THEODORE MACKLIN, B. S. A.,

Assistant Professor of Agricultural Economics.

B. S. A., Iowa State College, 1911; Dairy Lecturer in Department of Agricultural Extension, *ibid.*, 1911-'12; Graduate Student, *ibid.*, 1912-Feb. 1913; Graduate Student, University of Wisconsin, Feb. 1913-'15; Scholar in Agricultural Economics, *ibid.*, 1913-'14; Fellow in Agricultural Economics, *ibid.*, 1914-'15; Graduate Student, *ibid.*, Summers 1915 and 1916; Instructor in Rural Economics, Kansas State Agricultural College, 1915-March 28, 1917; Assistant Professor of Agricultural Economics, *ibid.*, March 28, 1917—.

Office A 59A; Res. 114 S. Eighth St.

. 9. Temporary appointment.

GEORGE MERRITT POTTER, D. V. M.,

Specialist in Veterinary Medicine, Division of College Extension.

D. V. M., Ohio State University, 1906; Scientific Assistant and Assistant in Animal Bacteriology, Bureau of Animal Industry, U. S. Department of Agriculture, 1906-'17; Specialist in Veterinary Medicine, Division of College Extension, Kansas State Agricultural College, May 1, 1917—.

ASSOCIATES

CHESTER ALLEN ARTHUR UTT, M. S.,

Associate in Feed Analysis.

B. S., Cornell College, 1903; M. S., *ibid.*, 1909; Graduate Student, State University of Iowa, 1903-'04; Instructor, Keokuk (Iowa) High School, 1904-'07; Graduate Student, State University of Iowa, Summer, 1907; Graduate Student, Kansas State Agricultural College, 1913-'14; Assistant Chemist, Kansas State Board of Health, 1907-'14; Associate Food Analyst, *ibid.*, 1914—; Assistant Chemist, Kansas State Dairy Commissioner, 1907-'14; Associate Chemist, *ibid.*, 1914—; Assistant in Food Analysis, Kansas State Agricultural College, 1907-'14; Associate in Feed Analysis, *ibid.*, 1914—.

Office W 30; Res. 1805 Leavenworth St.

RAYMOND CLIFFORD WILEY, B. S.,

Associate in Feeding Stuffs and Fertilizer Analysis, Agricultural Experiment Station.

B. S., Oklahoma College of Agriculture and Mechanic Arts, 1905; Assistant Chemist, Maryland Agricultural Experiment Station, 1905-'08; Assistant Chemist, Agricultural Experiment Station, Kansas State Agricultural College, 1908-'14; Associate in Feeding-stuffs and Fertilizer Analysis, Agricultural Experiment Station, *ibid.*, 1914—.

Office W 30; Res. 711 Humboldt St.

INSTRUCTORS

DAISY DOROTHY ZEININGER, A. B.,

Instructor in Mathematics.

A. B., Fairmount College, 1900; Instructor, Ellsworth High School, 1900-'04; Graduate Student, University of Chicago, Summer, 1909; Research work in Mathematics, University of Minnesota, Summer, 1914; Assistant in Mathematics, Kansas State Agricultural College, 1904-'07; Instructor in Mathematics, *ibid.*, 1907—.

Office G 28; 601 Humboldt St.

ANNETTE LEONARD, A. B.,

Instructor in English.

A. B., University of Kansas, 1906; Student, Wellesley College, 1897-1900; Instructor, Topeka City Schools, 1903-'04; Reference Library Assistant, University of Kansas, 1904-'05; Graduate Student, *ibid.*, 1906; Graduate Student, University of Chicago, Summers, 1910 and 1916; Assistant in English, Kansas State Agricultural College, 1907-'09; Graduate Student, University of Chicago, Summer, 1910; Instructor in English, *ibid.*, 1909-'11; Instructor in the English Language, *ibid.*, 1911—.

Office G 28; Res. 1646 Fairchild Ave.

WILLIAM LEONARD HOUSE,

Instructor in Wood Work; Foreman of Carpenter Shop.

Apprentice with J. Adams and Sons Company, Amherst, Mass., 1863-'68; with the Newton Wagon Works, Batavia, Ill.; Foreman, Carpenter Shop, Atchison, Topeka and Santa Fe Railroad Company, Las Vegas, N. M., 1880-'88; Cabinetmaker, with The Howell Company, Sioux City, Iowa, 1883-'88; Foreman of Carpenter Shop, Kansas State Agricultural College, 1888—; Instructor in Woodwork, *ibid.*, 1909—.

Office S 29; Res. 608 Moro St.

JAMES RUSSELL JENNESS,³ B. S.,

Instructor in Physics.

B. S., Denison University, 1906; Professor of Natural Science, Lenox College, 1906-'08; Assistant in Physics, University of Kentucky, 1908-'09; Assistant in Physics, Kansas State Agricultural College, 1909-'11; Graduate Student, University of Chicago, Summers, 1911, '12, and '15; Instructor in Physics, Kansas State Agricultural College, 1911—.

Office C 61; Res. 1405 Anderson Ave.

3. Absent on leave, year 1916-'17; resigned.

FRANK CLYDE HARRIS, B. S.,

Instructor in Architecture and Drawing.

B. S., Kansas State Agricultural College, 1908; City Engineer, Manhattan, 1907-'09; Supervising Engineer, W. K. Palmer Company, 1909; Assistant in Architecture and Drawing, Kansas State Agricultural College, 1909-'11; Graduate Student, Chicago Art Institute, Summer, 1910; Student, Italy, Germany, and France, Summer, 1911; Student, Italy, Greece, and Egypt, 1913-'14; Instructor in Architecture and Drawing, Kansas State Agricultural College, 1911—.

Office A 55; Res. 624 Bluemont Ave.

EDWARD GRANT,

Instructor in Molding; Foreman of Foundry.

Apprentice, with More and Dargie, Engineers, Millwrights, Iron and Brass Founders, Brechin, Forfarshire, Scotland, 1880-'86; with the Chicago Tire and Spring Company, Melrose Park, Ill., 1887-'90; Foreman of Foundry, R. Beaumont and Son, Kankakee, Ill., 1890-'97; with the David Bradley Manufacturing Company, Bradley, Ill., 1897-1900; Foreman of Foundry, Burrell Manufacturing Company, ibid., 1900-'05; Foreman, North Star Iron Works, Hammond, Ind., 1905-'08; Foreman, Burrell Manufacturing Company, Bradley, Ill., 1908-'13; Instructor in Molding, Foreman of Foundry, Kansas State Agricultural College, January 7, 1913—.

Office S 42; Res. 1638 Osage St.

IDA ETHEL RIGNEY,¹ B. S.,*Instructor in Domestic Science.*

B. S., Kansas State Agricultural College, 1909; Dietitian, Ensworth Hospital, St. Joseph, Mo., 1909-'10; Instructor, Wichita High School, 1910-'12; Assistant in Domestic Science, Kansas State Agricultural College, 1912-'13; Instructor in Domestic Science, ibid., 1913-January 1, 1917.

CHARLES WESLEY HOBBS, D. V. S.,

Instructor in Veterinary Medicine.

D. V. S., Western Veterinary College, Kansas City, Mo., 1901; Private Practice, Kensington, 1901-'04; Private Practice, Smith Center, 1904-'13; Instructor in Veterinary Medicine, Kansas State Agricultural College, 1913—.

Office V 27; Res. 303 N. Sixteenth St.

CONSTANCE MIRIAM SYFORD, A. M.,

Instructor in English.

A. B., University of Nebraska, 1909; A. M., ibid., 1911; Reader and Assistant in English Language and Literature, ibid., 1908-'10; Scholar in English Language and Literature, ibid., 1909-'10; Fellow in English Language and Literature, ibid., 1910-'11; Graduate Student and Scholar in English, Bryn Mawr College, 1911-'13; Instructor in English, Kansas State Agricultural College, 1913—.

Office G 32; Res. 721 Poyntz Ave.

ARTHUR ROY FEHN, Ph. B.,

Instructor in Mathematics.

Ph. B., Baldwin Wallace College, Berea, Ohio, 1903; Instructor in Mathematics, Park College Academy, 1904-'05; Assistant in Biology and Botany, Park College, 1905-'06; Principal, Argos (Ind.) High School, 1907-'08; Principal, Walnut (Ill.) High School, 1908; Assistant Superintendent, ibid., 1909-'10; Graduate Student, University of Chicago, Summer and Fall, 1908, and Summers, 1909, '10, and '13; Assistant in Mathematics, Kansas State Agricultural College, 1910-'13; Instructor in Mathematics, ibid., Dec. 1, 1913—.

Office A 70; Res. 1506 Poyntz Ave.

JOHN GROVER JACKLEY, D. V. M.,

Instructor in Bacteriology.

D. V. M., University of Pennsylvania, 1910; Research Assistant in Bacteriological Laboratory of Pennsylvania State Live Stock Sanitary Board, Philadelphia, 1908-'09; Demonstrator and Instructor in Pathological Histology, University of Pennsylvania, 1910-'11; Assistant in Bacteriology, Kansas State Agricultural College, 1911-'13; Instructor in Bacteriology, ibid., Dec. 1, 1913—.

Office V 53B; Res. 1625 Anderson Ave.

1. Resigned.

LOUIS HENRY LIMPER, A. M.,

Instructor in German.

A. B., Baldwin Wallace College, Berea, Ohio, 1907; A. M., University of Wisconsin, 1914; Instructor in German, Berea (Ohio) High School, 1907-'08; Instructor in English, Robert College, Constantinople, 1908-'11; Scholar in Modern Languages, Princeton University, 1911-'12; Graduate Student, University of Chicago, Summer, 1912; Instructor in French, University of Denver, 1912-'13; Graduate Student, University of Wisconsin, Summer, 1913; Graduate Student and Assistant in German, *ibid.*, 1913-Feb. 1, 1914; Instructor in German, Kansas State Agricultural College, Feb. 1, 1914—.

Office N 61; Res. 412 Moro St.

INA EMMA HOLROYD, B. S.,

Instructor in Mathematics.

B. S., Kansas State Agricultural College, 1897; B. S., Kansas State Normal School, 1916; Graduate, *ibid.*, 1899; Graduate Student, Harvard University, Summer School, 1905; Graduate Student, Cornell University, Summer, 1911; Assistant in Mathematics, Kansas State Agricultural College, 1900-'14; Instructor in Mathematics, *ibid.*, 1914—.

Office G. 28; Res. 1001 Moro St.

JESSIE ANNABERTA REYNOLDS, A. B.,

Instructor in History and Civics.

A. B., University of Kansas, 1905; B. S., Kansas State Agricultural College, 1906; Graduate Student, University of Kansas, Summers, 1905 and '06; Graduate Student, University of Chicago, Summers, 1907 and '10; Travel-study in Europe, Summers, 1909 and '12; Graduate Student, Columbia University, Summer, 1914; Graduate Student, University of California, Summer, 1915; Assistant in History and Civics, Kansas State Agricultural College, 1906; Instructor in History and Civics, *ibid.*, 1914—.

Office G 32; Res. 1205 Bluemont Ave.

FRANK CARL GUTCHE, M. S.,

Instructor in Chemistry.

B. S., University of Minnesota, 1910; M. S., University of Wisconsin, 1916; Night Chemist, Carver County Sugar Company, Chaska, Minn., Campaign of 1910; Graduate Student, University of Wisconsin, Summers, 1914, '15, and '16; Assistant in Chemistry, Kansas State Agricultural College, 1911-'14; Instructor in Chemistry, *ibid.*, 1914—.

Office C 64; Res. 1215 Vattier St.

WALTER GOLDSBERRY ALLEE, B. S.,

Instructor in Physics.

B. S., Earlham College, 1908; Instructor, Parke County (Ind.) Public Schools, 1908-'09; Principal of Ward School and Director of Athletics, Rockville (Ind.) City Schools, 1905-'07; Instructor and Director of Athletics, Hammond (Ind.) High School, 1908-'11; Graduate Student, University of Chicago, Summers, 1911 and '12; Instructor and Director of Athletics, Sioux City (Iowa) High School, 1911-'12; Assistant in Physics, Kansas State Agricultural College, 1912-'14; Instructor in Physics, *ibid.*, 1914—.

Office C 36; Res. 1445 Laramie St.

LOUISE FEWELL,

Instructor in Domestic Art.

Student, Winthrop Normal and Industrial College, Rock Hill, S. C., 1907-'11, and Summer, 1916; Student, Teachers' College, Columbia University, 1911-'12; Assistant in Domestic Art, Kansas State Agricultural College, 1912-'14; Instructor in Domestic Art, *ibid.*, 1914—.

Office L 65; Res. 928 Leavenworth St.

WILLIAM HENRY SANDERS, M. E.,

Instructor in Farm Motors.

B. S., Kansas State Agricultural College, 1890; M. E., *ibid.*, 1916; Carpenter, Lake Worth, Fla., 1890-'93; Engineer and Contractor, Reclamation Work, Palm Beach, Fla., 1893-'95, 1900-'02; Marine Steam and Gas Engineer, Lake Worth, Fla., 1895-1900; Foreman of Construction Work, West Palm Beach, Fla., 1902-'05; Marine Gas Engineer, Railway Extension, Miami, Fla., 1905-'06; in Dredging Work and Canal Construction, Florida, 1907-'12; Assistant in Power and Experimental Engineering, Kansas State Agricultural College, 1912-March, 1914; Assistant in Farm Motors, *ibid.*, March-September 1, 1914; Instructor in Farm Motors, *ibid.*, 1914—.

Office E 3; Res. 826 Osage St.

GRAYSON BELL MCNAIR,³ B. S.,*Instructor in Electrical Engineering.*

B. S., Purdue University, 1908; Assistant to Consulting Engineer, Louisville, Ky., 1908-'09; in Charge of Transformer Testing Department, Wagner Electric Manufacturing Company, St. Louis, Mo., 1909-'13; Assistant in Mathematics, Kansas State Agricultural College, May 1-July 1, 1913; Assistant in Electrical Engineering, *ibid.*, July 1, 1913-'14; Instructor in Electrical Engineering, *ibid.*, 1914—.
Office C 33; Res. 1324 Laramie St.

EMMA FLORA FECHT,

Instructor in Domestic Art.

Student, Kansas State Manual Training Normal School, Summers, 1905-'07; Supervisor of Sewing, Kansas City Public Schools, 1907-'10; Student Stout Institute, Summers, 1908-'10; Graduate, Bradley Polytechnic Institute, 1912; Assistant in Home Economics, State Normal School, Stevens Point, Wis., 1912-'13; Assistant in Domestic Art, Kansas State Agricultural College, 1913-'14; Instructor in Domestic Art, *ibid.*, 1914—.
Office L 56; Res. 203 Park Road.

RAY GATEWOOD, B. S.,

Instructor in Animal Husbandry.

B. S., Iowa State College, 1913; Assistant in Animal Husbandry, Kansas State Agricultural College, 1913-'14; Instructor in Animal Husbandry, *ibid.*, 1914—.
Office Ag 13; Res. 1621 Anderson Ave.

ETHEL HANNAH JONES, B. S.,

Instructor in Domestic Art.

B. S., Columbia University, 1913; Student, Smith College, 1906-'08; Graduate, Pratt Institute, 1910; Instructor, Scranton (Pa.) Evening Technical High School, 1911-'12; Graduate, Teachers' College, Columbia University, 1913; Assistant in Domestic Art, Kansas State Agricultural College, 1913-'14; Instructor in Domestic Art, *ibid.*, 1914—.
Office L 64; Res. 1610 Leavenworth St.

WALTER EDWIN TOMSON, B. S.,

Instructor in Dairy Husbandry.

B. S., Kansas State Agricultural College, 1912; with Department of Dairy Husbandry, *ibid.*, 1912-'13; Assistant in Dairy Husbandry, *ibid.*, 1913-'14; Instructor in Dairy Husbandry, *ibid.*, 1914—.
Office D 30; Res. 1524 Humboldt St.

LEO EDWARD MELCHERS, M. S.,

Instructor in Plant Pathology; Assistant Plant Pathologist, Agricultural Experiment Station.

B. S., Ohio State University, 1912; M. S., *ibid.*, 1913; Student Assistant in Horticultural Extension Schools, *ibid.*, 1911-'12; Assistant Botanist, Ohio Experiment Station, 1912-'13; State Collaborator, Plant Disease Survey, U. S. Department of Agriculture, 1914; Collaborator, Office of Cereal Investigations, *ibid.*, 1916; Assistant Plant Pathologist, Agricultural Experiment Station, Kansas State Agricultural College, October 1, 1913—; Instructor in Plant Pathology, *ibid.*, 1914—.
Office H 56; Res. 816 Laramie St.

JAMES WILLIAM BENNER,¹ D. V. M.,*Instructor in Veterinary Medicine.*

D. V. M., Kansas State Agricultural College, 1911; Assistant Agronomist, American Steel and Wire Company, Chicago, Ill., Summers, 1908, '09, and '10; Graduate Student, University of Kansas, 1912; Practice of Veterinary Medicine, 1911-'14; Assistant in Veterinary Medicine, Kansas State Agricultural College, March 1-Sept. 1, 1914; Instructor in Veterinary Medicine, *ibid.*, 1914-Jan. 1, 1917.

3. Absent on leave, 1916-'17; resigned.

1. Resigned.

OTIS EARLE HALL,⁴ A. B.,*Director of Junior Extension Service, Division of College Extension.*

A. B., Wabash College, 1907; Student, Wabash College, and Instructor in Public Schools, 1898-1903; Principal, Fairbanks Township High School, Sullivan Co., Ind., 1903-'04; Ward Principal, Crawfordville (Ind.) Public Schools, 1904-'05; Superintendent, New Market (Ind.) Public Schools, 1905-'06; Undergraduate Assistant in History, Wabash College, 1906-'07; County Superintendent of Schools, Montgomery Co., Ind., 1907-'14; Director of Junior Extension Service, Division of College Extension, Kansas State Agricultural College, and Coöperative Agent of U. S. Department of Agriculture, 1914—.

Office A 35; Res. 712 Poyntz Ave.

DANIEL EMMETT LYNCH,

Instructor in Forging; Foreman of Blacksmith Shop.

Apprentice in Blacksmithing, Hillsboro, Mo., 1888-'92; Graduate, Bryant and Stratton Business College, St. Louis, Mo., 1893; with Helmbacher Forge and Rolling Mill, ibid., 1893-'95; with James Frizzell and Company, Taylorville, Ill., 1895-'96; Foreman of Blacksmith Shops, Taylorville Coal Co., ibid., 1896-'98; Foreman of Blacksmith Shops, Blue Wing Mining Company, Cartersville, Mo., 1898-1900; Foreman of Blacksmith Shops, Webb City (Mo.) Cartersville Foundry and Machine Works, 1900-'14; Instructor in Forging and Foreman of Blacksmith Shops, Kansas State Agricultural College, 1914—.

Office S 38; Res. 907 Leavenworth St.

ILO IVAN TAYLOR,¹ B. S.,*Instructor in Applied Mechanics and Machine Design.*

B. S. in C. E., Iowa State College, 1910; Superintendent, City Waterworks, Storm Lake, Iowa, 1908-'06; on Government Survey, Flathead Indian Reservation, Montana, Summer, 1908; Structural Steel Construction, Hart-Parr Co., Charles City, Iowa, Summer, 1909; Resident Engineer on Construction, Sewer System and Sewage Disposal Plant, Storm Lake, Iowa, 1910-'11; Assistant Engineer, Coon River Drainage District, Buena Vista County, Iowa, and County Engineer, Sac County, Iowa, 1911-'12; Instructor in Mathematics, Colorado School of Mines, 1912-'13; Instructor in Mechanical and Civil Engineering, ibid., 1913-'14; Topographer, Colorado Geological Survey, Summer, 1913; U. S. Government Land Office Survey, Idaho, Summer, 1914; Instructor in Applied Mechanics and Machine Design, Kansas State Agricultural College, September 21, 1914 - October 16, 1916.

LEILA DUNTON, M. S.,

Instructor in Milling Industry.

B. S., Kansas State Agricultural College, 1910; M. S., ibid., 1912; Assistant in Milling Industry, ibid., 1912-'15; Instructor in Milling Industry, ibid., 1915—.

Office Ag 40; Res. 1688 Osage St.

JAMES WALKER MCCOLLOCH, B. S.,

Instructor in Entomology; Assistant Entomologist, Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1912; Special Field Agent, Department of Entomology, ibid., 1910-'12; Assistant in Entomology, ibid., 1912-'15; Assistant Entomologist, Agricultural Experiment Station, ibid., 1912—; Instructor in Entomology, ibid., 1915—.

Office F 64; Res. 905 Laramie St.

JENNIE LYNN COX, B. S.,

Instructor in Domestic Science.

A. B., Fairmount College, 1903; B. S., Kansas State Agricultural College, 1913; Graduate Student, University of Chicago, Summer, 1903; Instructor, Fairmount College, 1903-'11; Assistant in Domestic Science, Kansas State Agricultural College, 1913-'15; Instructor in Domestic Science, ibid., 1915—.

Office L 42; Res. 724 Houston St.

4. In coöperation with the U. S. Department of Agriculture.

1. Resigned.

ALICE EDNA SKINNER, B. S.,

Instructor in Domestic Science.

B. S., Kansas State Agricultural College, 1909; Assistant in Home Economics, Department of College Extension, *ibid.*, 1910-'11; Instructor in Domestic Science, Fairbury (Nebr.) High School, 1911-'12; Graduate Student, Teachers' College, Columbia University, 1912-'13; Assistant in Domestic Science, Kansas State Agricultural College, 1913-'15; Instructor in Domestic Science, *ibid.*, 1915—.
Office L 42; Res. 1408 Fairchild Ave.

PERCY LEIGH GAINES, A. M.,

Instructor in Bacteriology; Soil Bacteriologist, Agricultural Experiment Station.

B. Agr., North Carolina College of Agriculture and Mechanic Arts, 1908; M. S., *ibid.*, 1910; A. M., Washington University, 1911; Assistant Bacteriologist, North Carolina College of Agriculture and Mechanic Arts, 1908-'10; Teaching Fellow, Henry Shaw School of Botany, Washington University, 1910-'11; Instructor in Botany, University of Missouri, 1911-'14; Soil Bacteriologist in Agricultural Experiment Station, Kansas State Agricultural College, 1914; Assistant in Bacteriology, *ibid.*, 1914-'15; Instructor in Bacteriology, *ibid.*, 1915—.
Office V 26; Res. 112 S. Twelfth St.

JOHN DANIEL COOKE, A. M.,

Instructor in English.

A. B., Leland Stanford University, 1914; A. M., *ibid.*, 1915; Teaching Assistant in Greek, *ibid.*, 1913-'15; Instructor in English, Kansas State Agricultural College, 1915—.
Office G 28; Res. 1615 Anderson Ave.

FANNY DUNLAP, PH. B., B. L. S.,

Head Cataloguer in Library.

Ph. B., State University of Iowa, 1905; B. L. S., University of Illinois, 1915; Instructor, St. Louis (Mo.) Public Schools, 1906-'08, 1910-'11; Catalogue Assistant in Library, University of Illinois, 1912-'15; Head Cataloguer in Library, Kansas State Agricultural College, 1915—.
Office F 27; Res. 1410 Laramie St.

CARL SHERMAN HOAR,¹ A. M.,*Instructor in Botany.*

B. S., Dartmouth College, 1911; A. M., Harvard University, 1913; Graduate Student in Botany, *ibid.*, 1911-'15; Assistant in Botany, *ibid.*, 1911-'13; Student, Marine Biological Laboratory, Woods Hole, Mass., Summers, 1912, '13; Assistant in Botany, Radcliffe College, 1912-'15; Austin Teaching Fellow in Botany, Harvard University, 1913-'15; Instructor in Botany, Kansas State Agricultural College, 1915 - November 1, 1916.

LOULA ESDALE KENNEDY, A. B., R. N.,

Instructor in Domestic Science.

A. B., Goucher College, 1896; Graduate, Johns Hopkins Hospital Training School for Nurses, 1903; Registered Nurse in State of Maryland, 1905; Private Nursing, 1903-'07; Nurse-in-Charge, St. Anthony's Hospital, Dr. Grenfell's Mission, Labrador, 1907-'10; Second Assistant Superintendent of Nurses, Johns Hopkins Hospital, 1911-'12; Educational Secretary, Tuberculosis League of Pittsburg, Pa., 1912-'13; Public Health Nursing, Clarksburg, W. Va., 1913-'15; Student, Teachers' College, Columbia University, Summer, 1915; Instructor in Domestic Science, Kansas State Agricultural College, 1915—.
Office L 47; Res. 217 Park Road.

JOHN EARL SMITH, A. M.,

Instructor in Physics.

A. B., University of Indiana, 1912; A. M., University of Wisconsin, Summer, 1915; Student Assistant, Marion (Ind.) Normal School, 1903-'09; Graduate, *ibid.*, 1909; Principal, Burlington (Ind.) High School, 1909-'10; Instructor, Anderson (Ind.) High School, 1912-'13, 1914-'15; Assistant in Physics, University of Wisconsin, 1913-'14; Graduate Student, *ibid.*, Summers, 1912, '14, '15; Instructor in Physics, Kansas State Agricultural College, 1915—.
Office C 61; Res. 1445 Laramie St.

1. Resigned.

FRANCIS LAWRENCE SNOW,

Instructor in Industrial Journalism.

Special Student, University of Kansas, 1902-'03; Reporter on Rhodesia *Herald*, Salisbury, Rhodesia, South Africa, 1904; Assistant Editor, *ibid.*, 1905; with King-Richardson Publishing Co., Chicago, Ill., 1906-'09; Reporter and Writer of Special Articles for Topeka *State Journal*, 1909-'15; Editor, *Commercial Club Bulletin*, Topeka, 1914-'15; Instructor in Industrial Journalism, Kansas State Agricultural College, 1915—.
Office K 51; Res. 1001 Thurston St.

CARL POLLARD THOMPSON, B. S.,

Specialist in Animal Husbandry, Division of College Extension.

B. S., Kansas State Agricultural College, 1904; Farmer and Breeder of Pure-bred Livestock, 1904-'15; Specialist in Animal Husbandry, Division of College Extension, Kansas State Agricultural College, 1915—.
Office Ag 13A; Res. 1309 Poyntz Ave.

ALICE MAY CARLEY,

Instructor in Voice.

Graduate, Conservatory of Music, Knox College, 1911; Graduate Student and Assistant Teacher of Singing, *ibid.*, 1911-'12; Pupil of Pauline Waltmann Brandt, 1913-'16; Teacher of Singing, Salt Lake City, Utah, and Boise, Idaho, 1912-'16; Concert and Oratorio Artist, 1912-'16; Instructor in Voice, Kansas State Agricultural College, Jan. 1, 1916—.
Office M 51; Res. 1645 Fairchild Ave.

WINFIELD BURCHARD, A. M.,

Instructor in Chemistry.

A. B., Allegheny College, 1908; M. A., University of Wisconsin, 1911; Instructor in Science, Bowling Green (Ohio) High School, 1908-'09; Instructor in Science, Waukesha (Wis.) High School, 1909-'10; Graduate Student, University of Wisconsin, 1910-'11; Graduate Student and Assistant in Chemistry, *ibid.*, 1911-'14; Instructor in Chemistry, *ibid.*, 1914-'16; Instructor in Chemistry, Kansas State Agricultural College, Feb. 1, 1916—.
Office W 26; Res. 1615 Anderson Ave.

LEE RAYMOND DICE, PH. D.,

Instructor in Zoölogy; Assistant Zoölogist, Agricultural Experiment Station.

A. B., Leland Stanford University, Sept., 1911; M. S., University of California, 1914; Ph. D., *ibid.*, 1915; Student, Hopkins Marine Laboratory, Summer, 1911; Deputy Warden, Alaska Fisheries Service, U. S. Department of Commerce and Labor, 1911-'13; Graduate Student, Biological Laboratory, University of Montana, Summer, 1913; Instructor in Zoölogy and Assistant Zoölogist in Agricultural Experiment Station, Kansas State Agricultural College, Feb. 1, 1916—.
Office F 54A; Res. 1621 Anderson Ave.

THADDEUS HEDGES PARKS, B. S. A.,

Specialist in Entomology, Division of College Extension.

B. S. A., Ohio State University, 1909; Scientific Assistant, Bureau of Entomology, U. S. Department of Agriculture, 1909 - May, 1913; Extension Entomologist, University of Idaho, 1913-'15; Specialist in Entomology, Division of College Extension, Kansas State Agricultural College, March 15, 1916—.
Office A 33; Res. 414 N. Ninth St.

DON LAMAR BURK, A. M.,

Instructor in English.

A. B., De Pauw University, 1914; A. M., *ibid.*, 1915; Student, Indiana University, Summer, 1913; Assistant in Department of Public Speaking and Debate, De Pauw University, 1913-'14; Assistant Coach for High School and Intercollegiate Oratorical Contests, *ibid.*, 1912-'14; Professor of Public Speaking, Drama, and Debate, Otterbein University, 1914-'15; Graduate Student, Columbia University, 1915 - March 25, 1916; Head of Department of American Literature, and Dramatic Coach, Thomas Davidson School, New York City, 1915 - March 25, 1916; Instructor in English, Kansas State Agricultural College, March 25, 1916—.
Office A 53; Res. 532 N. Fourteenth St.

IRWIN T. BODE, B. S.,

*Instructor and Research Assistant in Forestry, Fort Hays Branch
Agricultural Experiment Station.*

B. S., Iowa State College; Instructor and Research Assistant, Fort Hays Branch
Agricultural Experiment Station, Kansas State Agricultural College, May 15, 1916—
Office and Res., Hays, Kansas.

HELEN LOUISE GREEN, B. S.,

Instructor in Domestic Science.

B. S., Simmons College, 1915; Graduate Student in Household Economics, *ibid.*,
1910-'12; Instructor of Evening Classes, North Bennett Street Industrial School, Boston,
Mass., 1911-'12; Graduate Student, Teachers' College, Columbia University, Summer,
1912; Student, University of Colorado, Summer, 1915; Assistant in Domestic Science,
Kansas State Agricultural College, 1912-'17; Instructor in Domestic Science, *ibid.*, 1916—
Office L 42; Res. 1516 Leavenworth St.

ANDREW MINIE PATERSON, B. S.,

Instructor in Animal Husbandry.

B. S., Kansas State Agricultural College, 1913; Graduate, School of Agriculture, Uni-
versity of Minnesota, 1910; Assistant in Animal Husbandry, Kansas State Agricultural
College, October 1, 1913-'16; Instructor in Animal Husbandry, *ibid.*, 1916—
Office Ag 13; Res. 1100 Blumont Ave.

REUBEN EDWARD WISEMAN,¹ B. S.,

Instructor in Farm Mechanics.

B. S., Kansas State Agricultural College, 1913; Engineer, Garden City Branch Agri-
cultural Experiment Station, July 1, 1913-Jan. 1, 1914; Assistant in Farm Mechanics,
Kansas State Agricultural College, Jan. 1, 1914-'16; Instructor in Farm Mechanics, *ibid.*,
1916-Aug. 1, '17.

ETHEL VANDERWILT, B. S.,

Instructor in Animal Husbandry.

B. S., Kansas State Agricultural College, 1913; Special Assistant to the Dean of the
Division of Agriculture, *ibid.*, 1913-'14; Assistant in Animal Husbandry, *ibid.*, April 1,
1914-'16; Instructor in Animal Husbandry, *ibid.*, 1916—
Office Ag 8; Res. 1114 Houston St.

NELLIE IRENE McCLURG, A. B.,

Instructor in Domestic Science.

A. B., University of Illinois, 1912; Supervisor of Household Science, East Aurora
(Ill.) Public Schools, 1912-'14; Assistant in Domestic Science, Kansas State Agricultural
College, 1914-'16; Instructor in Domestic Science, *ibid.*, 1916—
Office L 42; Res. 723 Houston St.

EDGAR VERMONT COLLINS, B. S.,

Instructor in Steam and Gas Engineering.

B. S. in Agricultural Engineering, Iowa State College, 1914; B. S. in Agronomy, *ibid.*,
1914; Student in Agriculture, *ibid.*, 1905-'08; Operator of Traction Engines, Summers,
1906-'12; General Farming, 1908-'12; Student in Agricultural Engineering, Iowa State
College, 1912-'14; Assistant in Agricultural Engineering, *ibid.*, 1914-'15; Assistant in
Steam and Gas Engineering, Kansas State Agricultural College, 1915-'16; Instructor in
Steam and Gas Engineering, *ibid.*, 1916—
Office E 31; Res. 1825 Leavenworth St.

NORMAN EVERETT OLSON, B. S.,

Instructor in Dairy Husbandry.

B. S. in Dairying, Iowa State College, 1915; Assistant in Dairy Husbandry, Kansas
State Agricultural College, 1915-'16; Instructor in Dairy Husbandry, *ibid.*, 1916—
Office D 30; Res. 617 Houston St.

1. Resigned.

JAMES WALTER ZAHNLEY, B. S.,*Instructor in Farm Crops.*

B. S., Kansas State Agricultural College, 1909; Superintendent, Dwight City Schools, 1909-'10; Student, University of Kansas, Summer, 1910; Instructor in Agriculture, El Dorado High School, 1910-'15; Teacher in Agronomy, Kansas State Agricultural College, Summer, 1914; Assistant in Agronomy, *ibid.*, 1915-'16; Instructor in Farm Crops, *ibid.*, 1916—.

Office Ag 79; Res. 1131 Laramie St.

ROBERT KLINE BONNETT, B. S.,*Instructor in Farm Crops.*

B. S., Kansas State Agricultural College, 1913; Assistant in Farm Crops, *ibid.*, July 1, 1913-'16; Graduate Student, University of Wisconsin, 1915-'16; Instructor in Farm Crops, Kansas State Agricultural College, 1916—.

Office Ag 82; Res. 1819 Poyntz Ave.

MARY MARIA BAIRD, B. S.,*Specialist in Home Economics, Home Study Service, Division of College Extension.*

B. S., Kansas State Agricultural College, 1917; Graduate, Kansas State Normal School, 1904; Teacher, Kansas Rural Schools, Seven Years; Principal, Le Roy High School, 1904-'05; Principal, Florence High School, 1907-'08; Principal, Carbondale High School, 1908-'10; Teacher of Latin and English, Labette County High School, 1910-'14; Student, University of Kansas, Summers, 1908 and 1909; Student, Kansas State Manual Training Normal School, Summer, 1914; Student, Kansas State Agricultural College, 1914-'16; Specialist in Home Economics, Home Study Service, *ibid.*, 1916—.

Office A 5; Res. 355 N. Fifteenth St.

ELTON CALKINS,¹*Instructor in Voice.*

Graduate, Albany (N. Y.) Business College, 1905; Student in Piano, 1903-'09; Pupil of Lena Doria Devine, 1910-'12; Pupil of G. A. Grant Schaefer, 1913-'14; Pupil of Louis Kriedler, 1914-'15; Coached with Gordon Campbell, 1915-'16; Concert Work and Private Teaching, Chicago, Ill., 1915-'16; Special Student, School of Music, Northwestern University, 1914; Instructor in Voice, Kansas State Agricultural College, 1916-'17.

CHARLES DEGUIRE CHRISTOPH, A. B.,*Instructor in English.*

A. B., University of Michigan, 1912; Instructor in English, University of the Philippines, 1912-'14; Graduate Student in English, University of Missouri, 1915-'16, and Summer, 1915; Instructor in English, Kansas State Agricultural College, 1916—.

Office A 63; Res. 1621 Anderson Ave.

AMOS HENRY HERSH, A. M.,*Instructor in Zoölogy.*

A. B., Franklin and Marshall College, 1914; A. M., *ibid.*, 1915; Student, Cold Spring Harbor (L. I.) Biological Laboratory, Brooklyn Institute of Arts and Sciences, 1914; Assistant in Biology, Franklin and Marshall College, 1914-'15; Assistant in Biology, Princeton University, 1915-'16; Instructor in Zoölogy, Kansas State Agricultural College, 1916—.

Office F 62; Res. 1621 Anderson Ave.

EDWARD JONES, B. M. E.,*Instructor in Shop Practice.*

B. M. E., Iowa State College, 1905; Technical Apprentice, Fairbanks Morse and Company, Beloit, Wis., 1906; Draughtsman, *ibid.*, 1907; Manager of Garage, Kenmare, N. D., 1908-'09; Gas Engine Builder and Tester with Fairmont (Minn.) Machine Co., 1910; Motor Builder and Tester with Gramm Motor Co., Lima, Ohio, 1910-'13; Engine Assembler and Tester with Buckeye Machine Co., *ibid.*, 1913-'14; Motor Truck Builder and Tester and Inspector with Gramm-Bernstein Motor Truck Co., *ibid.*, 1914-'16; Instructor in Shop Practice, Kansas State Agricultural College, 1916—.

Office S 31; Res. 923 Osage St.

1. Resigned.

LEE ROY LIGHT,¹ M. S.,*Instructor in English.*

B. S., Kansas State Agricultural College, 1915; M. S., *ibid.*, 1916; Graduate, Kansas State Normal School, 1906; Student, University of Kansas, Summer, 1909; Student, University of California, Summer, 1915; County Superintendent (by appointment), Thomas county, 1902-'03; Principal, Jefferson School, Iola, 1905-'06; Superintendent of Schools, Hays, 1906-'10; Principal, Norton County High School, 1911-'14; Instructor in County Institutes in Kansas, 1906-'14; Instructor in English, Kansas State Agricultural College, 1916-March 6, 1917.

ELIZABETH MACLEAN, B. PH., M. DI.,

Instructor in English.

B. Di., Iowa State Teachers' College, 1894; M. Di., *ibid.*, Summer, 1900; B. Ph., University of Chicago, 1909; Teacher, Carroll (Iowa) Public Schools, 1894-'95; Teacher, Atlantic (Iowa) Public Schools, 1895-'97, 1898-'99; Student, Iowa State Teachers' College, Summer, 1899; Instructor in English, *ibid.*, 1899-1901; Student, University of Chicago, Winter, 1900, and Spring and Summer, 1907; Life Diploma to Teach in Iowa, 1900; Assistant Professor of English, Iowa State College, 1901-'07; Associate Professor of English, *ibid.*, 1907-'14; Professor of English, *ibid.*, 1914-'16; Instructor in English, Northern Illinois State Normal School, Summer, 1915; Professor of Ancient and Modern Languages, *ibid.*, Spring and Summer, 1916; Instructor in English, Kansas State Agricultural College, 1916—.

Office A 54; Res. 337 N. Sixteenth St.

WALTER HENRY PIELEMEIER, A. B.,

Instructor in Physics.

A. B., University of Michigan, 1916; Student, Indiana State Normal School, 1911-'12; Teacher, Tangier (Ind.) High School, 1912-'13; Graduate Student, University of Michigan, Summer, 1916; Instructor in Physics, Kansas State Agricultural College, 1916—.

Office C 61; Res. 907 Osage St.

F. RAYMOND SMITH, A. B.,

Instructor in Physics.

A. B., Albion College, 1914; Assistant in Physics, *ibid.*, 1913-'14; Teacher of Science, Ithaca (Mich.) High School, 1914-'15; Teacher of Science and Athletic Director, Grand Ledge (Mich.) High School, 1915-'16; Student, University of Illinois, Summer, 1915; Graduate Student, University of Michigan, Summer, 1916; Instructor in Physics, Kansas State Agricultural College, 1916—.

Office C 61; Res. 1709 Laramie St.

MARY EMELINE WRIGHT,

Specialist in Home Economics, Division of Home Economics.

Graduate, Kansas State Normal School, 1910; Teacher of Basketry, Boys' Industrial School, Topeka, 1910-'11; Student, American College of Dressmaking and Tailoring, Kansas City, Mo., Summer, 1911; Teacher of Domestic Art, Greeley (Colo.) Public Schools, 1911-'13; with Adler's Millinery House, Kansas City, Mo., Summer, 1913; Teacher of Domestic Art, Tacoma (Wash.) High School, 1913-'14; Student, University of California, 1914-'15; in Dressmaking Establishment, New York City, 1915-'16; Student, Columbia University, Summer, 1916; Specialist in Home Economics, Division of College Extension, Kansas State Agricultural College, 1916—.

Office A 36; Res. 1204 Fremont St.

JULES HENRY ROBERT, B. S.,

Instructor in Applied Mechanics.

B. S., University of Illinois, 1914; Assistant in Mechanical Engineering, Rensselaer Polytechnic Institute, 1914-'16; Instructor in Applied Mechanics, Kansas State Agricultural College, Oct. 16, 1916—.

Office E 8A; Res. 1020 Leavenworth St.

DANIEL WALTER ZIEGLER, B. S.,

Specialist in Animal Husbandry, Home Study Service, Division of College Extension.

B. S., Kansas State Agricultural College, 1913; Teacher of Agriculture and Science, Chase County High School, 1913-'14; Assistant Editor, *National Stockman and Farmer*, 1915-'16; Farmer, 1916; Specialist in Animal Husbandry, Home Study Service, Division of College Extension, Kansas State Agricultural College, Nov. 1, 1916—.

Office A 5; Res. 1001 Thurston St.

1. Resigned.

JOHN PATTERSON,¹ D. V. M.,*Instructor in Veterinary Medicine.*

D. V. M., Iowa State College, 1912; Technician and Demonstrator in Anatomy and Histology, *ibid.*, 1910-'12; Assistant in Poisonous Plants, *ibid.*, 1910-'12; Private Veterinary Practice, 1912-'17; Instructor in Veterinary Medicine, Kansas State Agricultural College, Feb. 1 - April 21, 1917.

JEAN JOSEPHINE STEWART,⁹ B. S.,*Instructor in Domestic Science.*

B. S., Teachers' College, Columbia University, 1911; Instructor in Household Science, Illinois State Normal University, 1911-'14; Head of Department of Household Science, Rockford (Ill.) College, 1914-'16; Graduate Student, Teachers' College, Columbia University, Summer, 1916, and First Semester, 1916-'17; Instructor in Domestic Science, Kansas State Agricultural College, Feb. 1 - July 1, 1917.
Office L 47; Res. 1628 Laramie St.

LOTTIE MILAM, B. S.,*Assistant Club Leader, Boys' and Girls' Club Work, Division of College Extension.*

B. S., Oregon State Agricultural College, 1914; Teacher, Missouri Public Schools, 1907-'10; Student Assistant in Art Department, Howard-Payne College, Fayette, Mo., 1911-'12; Teacher of Domestic Science, Klamath County (Oregon) High School, 1914-'15; Teacher of Domestic Science, Benson Polytechnic School for Girls, Portland, Oregon, 1915-'17; Assistant Club Leader, Boys' and Girls' Club Work, Division of College Extension, Kansas State Agricultural College, March 20, 1917—.
Office A 35; Res. 1408 Fairchild Ave.

JAMES FRANKLIN PAGE, A. M.,*Instructor in English.*

Ph. B., University of Chicago, 1916; A. M., *ibid.*, 1917; Superintendent of Schools, Powersville, Mo., 1911-'12; Graduate, Kirksville (Mo.) State Normal School, 1913; Superintendent of Schools and Teacher of English in High School, Laclede, Mo., 1913-'15; Instructor in English, Kansas State Agricultural College, April 1, 1917—.
Office A 53; Res. 1615 Anderson Ave.

ASSISTANTS**CHARLES YOST,***Assistant in Machine Shop.*

Assistant in Heat and Power Department, Kansas State Agricultural College, 1902-'03; Operating Engineer for Lee Electric Light Co., Superior, Neb., 1904; Special Student, Cushman Motor Works, Lincoln, Nebr., Summer, 1915; Assistant in Heat and Power Department, Kansas State Agricultural College, 1905-'10; Foreman of Boiler Room, *ibid.*, 1910-'12; Assistant in Machine Shop, *ibid.*, 1912—.
Office S 32; Res. 1230 Laramie St.

JOHN THOMPSON PARKER,*Assistant in Woodwork.*

Student, Lakin High School, 1897; Graduate, Apprentice Course in Woodwork, Kansas State Agricultural College, 1902; Carpenter, 1902-'04; Farmer, 1904-'05; Student, Stout Institute, Summer, 1916; Assistant in Woodwork, Kansas State Agricultural College, 1906—.
Office S 26; Res. 926 Vattier St.

HUGH OLIVER,¹*Assistant in Heat and Power Distribution.*

Apprentice, Heat and Power Department, Kansas State Agricultural College, 1902-'03; Assistant in Heat and Power Department, *ibid.*, 1906-'12; Assistant in Heat, Water and Gas Distribution, *ibid.*, 1912-'14; Assistant in Heat and Power Distribution, *ibid.*, 1914-Feb. 1, 1917.

1. Resigned.

9. Temporary appointment.

AMY ALENA ALLEN, B. S.,

Assistant in Printing.

B. S., Kansas State Agricultural College, 1904; Apprentice in Department of Printing, Kansas State Agricultural College, Summer, 1900; Student Assistant, *ibid.*, 1901-'04; Proof-reader, Department of Printing, *ibid.*, 1904-'09; Assistant in Printing, *ibid.*, 1909—. Office K 3; Res. 1452 Fairchild Ave.

JESSIE GULICK,

Assistant Cataloguer in Library.

Instructor, Kansas Public Schools, 1899-1901 and 1903-'05; Instructor, Virginia Public Schools, 1901-'03; Student Library School, University of Illinois, Summer, 1914; Chief Clerk, Division of College Extension, Kansas State Agricultural College, 1907-'09; Assistant in Library, *ibid.*, 1909-'11; Assistant Cataloguer in Library, *ibid.*, 1911—. Office F 27; Res. 1622 Osage St.

EDWARD CLAEREN, Commissary Sergeant U. S. A. (Retired),

Assistant to the Commandant.

Commissary Sergeant, U. S. A. (Retired); Assistant to the Commandant, Kansas State Agricultural College, 1910—. Office N. 26; Res. 1331 Houston St.

ALANSON LOLA HALLSTED,⁴ B. S.,

Assistant in Dry Farming, Fort Hays Branch Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1903; in General Farming and Coöperative Work with Agronomy Department, Kansas State Agricultural Experiment Station, 1904-'09; Special Agent, Bureau of Plant Industry, U. S. Department of Agriculture, 1909-'10; Assistant in Dry Farming, Fort Hays Branch Agricultural Experiment Station, 1910—. Office and Res., Hays, Kansas.

ALBERT RICHARD LOSH,¹ B. S., C. E.,

Assistant State Engineer, Division of College Extension.

B. S., Kansas State Agricultural College, 1910; C. E., *ibid.*, 1916; Instructor in Bureau of Education, Philippine Islands, 1904-'07; Student, Philippine School of Arts and Trades, 1906; Graduate Student, Massachusetts Institute of Technology, 1914; Engineering Assistant, Office of Public Roads, United States Department of Agriculture, 1915; Assistant State Engineer, Division of College Extension, Kansas State Agricultural College, 1910-Oct. 20, 1916—.

BRUCE STEINHOFF WILSON, B. S.,

Assistant in Coöperative Experiments.

B. S., Kansas State Agricultural College, 1908; Farm Foreman, Kansas State Agricultural College, 1910-'11; Assistant in Agronomy and Foreman of Experimental Farm, *ibid.*, 1911-'12; Assistant in Coöperative Experiments, *ibid.*, 1912—. Office Ag 59; Res. 514 N. Manhattan Ave.

BURR HOWEY OZMENT,¹

Band Leader.

Band-master, Baker University, 1900-'03; Band-master, University of Missouri, 1904-'10; Band Leader, Kansas State Agricultural College, 1911-'17.

ASHER EULESTA LANGWORTHY, Ph. C.,

Feeding-stuffs Inspector, Agricultural Experiment Station.

Ph. C., University of Kansas, 1901; in Commercial Work, 1901-'12; Feeding-stuffs Inspector, Agricultural Experiment Station, Kansas State Agricultural College, Aug. 15, 1912—. Office Ag 26; Res. west of K. S. A. C. Campus.

1. Resigned.

4. In coöperation with the U. S. Department of Agriculture.

WALTER JACOB KING,¹ B. S.,

Assistant Drainage Engineer, Division of College Extension.

B. S., Kansas State Agricultural College, 1909; Superintendent of Trades School, Kansas State Industrial Reformatory, Hutchinson, 1909-'12; Fellow in Engineering, Kansas State Agricultural College, 1912-'13; Assistant Engineer, Division of College Extension, *ibid.*, 1913-May 9, '17.

HARLEY JAMES BOWER,⁴ M. S.,

Lecturer on Soils, Division of College Extension.

B. S., Kansas State Agricultural College, 1910; M. S., Ohio State University, 1912; Graduate Student and Assistant in Soils, *ibid.*, 1910-'12; Agronomist, Connecticut Experiment Station, 1912-'13; District Demonstration Agent, Southeastern Kansas Division of College Extension, Kansas State Agricultural College, Feb. 1913-Jan. 1, 1915; Lecturer on Soils, Division of College Extension, *ibid.*, Jan. 1, 1915—.
Office Ag 60; Res. 927 Humboldt St.

OLIVE CARLTON MILLER,

Feeding-stuffs Inspector, Agricultural Experiment Station.

With Operating and Auditing Department, Chicago, Burlington and Quincy Railroad Company, 1892-1913; Feeding-stuffs Inspector, Agricultural Experiment Station, Kansas State Agricultural College, June 1, 1913—.
Office Ag. 28; Res. 407 Leavenworth St.

JAMES PLUMMER POOLE,⁶ B. S.,

Assistant in Botany.

B. S., University of Maine, 1912; Instructor in Botany, Washburn College, 1912-'13; Assistant in Botany, Kansas State Agricultural College, Aug. 1, 1913—.
Office H 57; Res. 501 Laramie St.

GRACE CUSHING AVERILL,

Assistant in Home Art.

Graduate, Wisconsin State Normal School, 1906; Graduate Student of Manual Arts, *ibid.*, 1909-'10; Graduate Student and Student Assistant in Mechanical Drawing, Bradley Polytechnic Institute, 1910-'12; Instructor in Manual Arts, Anaheim (Cal.) Public Schools, 1912-'13; Assistant in Drawing, Kansas State Agricultural College, 1913-'15; Assistant in Home Art, *ibid.*, 1915—.
Office A 68; Res. 1408 Fairchild Ave.

WILLIAM HENRY BALL,

Assistant in Woodwork.

Student, Salt City Business College, Winters, 1904-'06; Apprentice Carpenter, 1902-'07; with Gauze and Minor, Haviland, 1907-'09; with H. N. Duckworth, Pratt, 1909-'11; Instructor in Manual Training, Pratt High School, 1911-'13; Assistant in Woodwork, Kansas State Agricultural College, 1913—.
Office S 26; Res. 1126 Pierre St.

ROBERT GETTY,⁴ B. S. A.,

Assistant in Forage Crops, Fort Hays Branch Agricultural Experiment Station.

B. S. A., University of Nebraska, 1913; Assistant in Forage Crops, Fort Hays Branch Agricultural Experiment Station, 1913—.
Office and Res., Hays, Kansas.

GRACE GLASGOW, M. S.,

Assistant in Bacteriology.

B. S., University of Illinois, 1912; M. S., *ibid.*, 1912; Graduate Student, *ibid.*, 1912-'13; Assistant in Bacteriology, Kansas State Agricultural College, 1913—.
Office V 54; Res. 203 Park Road.

1. Resigned.

4. In coöperation with the U. S. Department of Agriculture.

6. Absent on leave, year 1916-'17.

EDITH ELIZABETH HAGUE, A. B.,

Assistant in Library.

A. B., University of Kansas, 1910; Graduate Student, Illinois Library School, 1912-'13; Assistant in Library, Kansas State Agricultural College, 1913—. Office F 28; Res. 1080 Bluemont Ave.

FREDERIC ARTHUR KIENE,⁴ B. S.,*Assistant in Cereal Crops, Fort Hays Branch Agricultural Experiment Station.*

B. S., Kansas State Agricultural College, 1906; Newspaper Work and General Farming, 1906-'12; Assistant in Cereal Crops, Fort Hays Branch Agricultural Experiment Station, 1912—. Office and Res., Hays, Kansas.

ERWIN JONES MONTAGUE, B. S.,

Assistant to Superintendent, Fort Hays Branch Agricultural Experiment Station.

B. S., Oregon Agricultural College, 1913; Assistant to Superintendent, Fort Hays Branch Agricultural Experiment Station, 1913—. Office and Res., Hays, Kansas.

STANLEY ALBERT SMITH, B. S.,

Assistant in Architecture and Drawing.

B. S., Kansas State Agricultural College, 1913; in Architectural Practice, Summers, 1913, '15, and '16; Assistant in Architecture and Drawing, Kansas State Agricultural College, Oct. 1, 1913—. Office A 55A; Res. 812 Laramie St.

HAROLD MORTON JONES, B. S.,

Deputy State Dairy Commissioner.

B. S., Purdue University, 1908; Manager of Indiana Creameries, 1908-'13; Deputy State Dairy Commissioner, Nov., 1913—. Office X; Res. 808 N. Juliette Ave.

FANCHON IDALINE EASTER,¹*Assistant in Piano.*

Pupil of Rafael Navas, 1909-'13; Diploma, Institute of Musical Art, Wichita, 1911; Instructor in Piano, Institute of Musical Art, Wellington, 1912-'13; Concert Artist and Instructor in Music, 1913; Assistant in Music, Kansas State Agricultural College, Jan. 20, 1914-'17.

LEWIS LEROY LEEPER,¹*Miller, Department of Milling Industry.*

Assistant Miller, Kaw Mills, Topeka, 1907 and '08; Head Miller, Dwight Mills, Graceville, Minn., 1909; Head Miller, Cozad Roller Mills, Cozad, Nebr., 1910 and '11; Head Miller and Superintendent, Denton Milling Company, Denton, Texas, 1912; Head Miller and Superintendent, Royal Milling Company, Milliken, Colo., 1913; Miller, Department of Milling Industry, Kansas State Agricultural College, Feb. 23, 1914-Jan. 1, 1917.

WILLIAM PATRICK HAYES, B. S.,

Assistant in Entomology.

B. S., Kansas State Agricultural College, 1913; Graduate Student Assistant in Entomology and Zoölogy, *ibid.*, 1913-'14; Assistant in Entomology, *ibid.*, April 1, 1914—. Office F 59; Res. 911 Bluemont Ave.

FLOYD PATTISON,

Assistant in Heat and Power.

B. S., Kansas State Agricultural College, 1912; Employee of Smith Gas Power Company, Lexington, Ohio, 1912-'13; Fellow in Steam and Gas Engineering, Kansas State Agricultural College, 1913-June 15, 1914; Assistant in Heat and Power, *ibid.*, June 15, 1914—. Office E 3; Res. 515 Bluemont Ave.

1. Resigned.

4. In coöperation with the U. S. Department of Agriculture.

PRESTON ESSEX McNALL, B. S.,

Assistant in Farm Management Studies, Division of College Extension.

B. S. in E. E., Kansas State Agricultural College, 1909; B. S. in Agriculture, *ibid.*, 1913; with Pacific Electric Company and Edison Electric Company, Los Angeles, Cal., 1909-'11; Graduate Student in Farm Management, Cornell University, Fall, 1916; Fellow in Soils, Kansas State Agricultural College, 1913-'14; Assistant in Farm Management Studies, Division of College Extension, *ibid.*, 1914—.

Office A 36; Res. 628 Fremont St.

ALBERT WILLIAM BELLOMY,¹ B. S.,*Assistant in Zoölogy; Assistant in Genetics, Agricultural Experiment Station.*

B. S., Kansas State Agricultural College, 1914; Student Assistant in Zoölogy, *ibid.*, 1912-'14; Assistant in Zoölogy, and Assistant in Genetics in Agricultural Experiment Station, *ibid.*, 1914-Dec. 31, 1916.

REBECCA PAULINE BARTHOLOMEW,

Assistant in Domestic Science.

Student, Teachers' College, Columbia University, 1907-'08, 1912-'14, and Summers, 1914 and 1915; Student, Valparaiso University, 1909; Assistant in Domestic Science, Kansas State Agricultural College, 1914—.

Office L 47; Res. 800 Houston St.

MARION PERCIVAL BROUGHTON,⁴ A. B., B. S.,*Institute Specialist in Home Economics, Division of College Extension.*

A. B., Leland Stanford University, 1900; B. S., Kansas State Agricultural College, 1914; Student, Hopkins Seaside Laboratory, Summers, 1899, 1900; Teacher, California Public Schools, 1900; Teacher, Pueblo (Colo.) Public Schools, 1901-'03; Teacher in Private School, Denver, Colo., 1903-'04; Principal, Georgetown, (Colo.) High School, 1904-'05; Teacher, Marysville Public Schools, 1910-'12; Institute Specialist in Home Economics, Division of College Extension, Kansas State Agricultural College, 1914—.

Office A 35; Res. 203 Park Road.

LOUISE CALDWELL,⁴ A. B.,*Specialist in Home Economics, Division of College Extension.*

A. B., Kentucky College for Women, 1904; Primary Instructor, Lee's Collegiate Institute, Jackson, Ky., 1904-'05; Student Dietitian, Newport (R. I.) Hospital, Summer, 1913; Graduate, Drexel Institute, 1914; Instructor in Domestic Science, Presbyterian Deaconess Home, Philadelphia, Pa., 1913-'14; Specialist in Home Economics, Division of College Extension, Kansas State Agricultural College, 1914—.

Office A 36; Res. 224 N. Fourteenth St.

ELIZABETH HAMILTON DAVIS, A. B., B. L. S.,

Assistant Reference Librarian.

A. B., Illinois Woman's College, 1909; B. L. S., University of Illinois Library School, 1914; Graduate, Southern Illinois State Normal University, 1910; Student, University of Illinois Library School, 1910-'11; Temporary General Assistant, Oak Park (Ill.) Public Library, Summer, 1911; Assistant in Charge of Loan Department, Illinois State Normal University, 1911-'13; Temporary Catalogue Assistant, University of Illinois Library, Summer, 1914; Assistant Reference Librarian, Kansas State Agricultural College, 1914—.

Office F 35; 421 N. Sixteenth St.

MARION HARRISON,¹³*Assistant in Domestic Art.*

Graduate, Mechanics Institute, Rochester, N. Y., 1913; Student Assistant in Domestic Art, *ibid.*, 1912; Instructor in Domestic Art, Y. W. C. A., New York City, 1913-'14; Instructor in Domestic Art, Vacation Schools, Rochester, N. Y., Summer, 1914; Assistant in Domestic Art, Kansas State Agricultural College, 1914—.

Office L 65; 315 N. Sixteenth St.

1. Resigned.

4. In coöperation with the U. S. Department of Agriculture.

13. Absent on leave, April 1 to July 1, 1917.

FLORENCE HUNT,

Assistant in Domestic Art.

Graduate, Pratt Institute, 1910; Trade Designer, 1910-'14; Assistant in Domestic Art, Kansas State Agricultural College, 1914—.
Office L 64; Res. 1408 Fairchild Ave.

GRACE ADELLA PALMER,

Assistant in Domestic Art.

Graduate, Mechanics Institute, Rochester, New York, 1914; Student Assistant in Domestic Art, Evening School, *ibid.*, 1913-'14; Assistant in Domestic Art, Kansas State Agricultural College, 1914—.
Office L 65; Res. 315 N. Sixteenth St.

NELLIE EVELYN REED, B. S.,

Assistant in Zoölogy.

B. S., Kansas State Agricultural College, 1914; Student Assistant in Zoölogy, *ibid.*, 1913-'14; Graduate Student, University of Michigan, Summer, 1915; Assistant in Zoölogy, Kansas State Agricultural College, 1914—.
Office F 55; Res. 208 Park Road.

OTIS EVERETT STRODTMAN,⁴ D. V. S.,*Deputy Inspector and College Representative, Marshall County Hog Cholera Eradication Project.*

D. V. S., Kansas City Veterinary College, 1911; Dairy and Milk Inspector, Arkansas City, 1912-'13; Assistant in Marshall County Hog Cholera Eradication Project, Kansas State Agricultural College, 1914—.
Office and Res., Marysville, Kansas.

ERWIN MILTON TIFFANY,¹ A. B.,*Assistant in Home Study Service, Division of College Extension.*

A. B., Baker University, 1908; B. S., Kansas State Agricultural College, 1915; Student Assistant in Botany, Baker University, 1907-'08; Bookkeeper, C. A. Smith Lumber Company, Marshfield, Oregon, 1908-'09; Principal, Madras (Oregon) High School, 1909-'10; Farmer, 1910-'12; Principal, Great Bend High School, 1913-'14; Assistant in Home Study Service, Kansas State Agricultural College, 1914—Feb. 24, 1917.

LUCILE WARNOCK, A. B.,

Assistant in Library.

A. B., Monmouth College, 1913; General Assistant in Public Library, Oskaloosa, Iowa, 1912; Student, University of Illinois Library School, 1913-'14; General Assistant in Library, Miami University, Summer, 1914; Assistant in Library, Kansas State Agricultural College, 1914—.
Office F 31; Res. 321 N. Sixteenth St.

EPHA ESTELLA MATHER,⁴ B. S.,*Lecturer on Home Economics, Division of College Extension.*

B. S., Kansas State Agricultural College, 1913; Teacher, Gove County Public Schools, 1899-1905; Student, Hays Branch State Normal School, 1905; County Superintendent of Schools, Gove County, 1905-'09; Instructor, Normal Institute, Gove County, 1908, '09, '11, '12; Head of Domestic Science and Art Department, Polytechnic High School, San Diego, Cal., 1913-'14; Lecturer on Home Economics, Division of College Extension, Kansas State Agricultural College, September 15, 1914—.
Office A 35; Res. 1329 Anderson Ave.

WALTER LEROY LATSHAW, B. S.,

Assistant in Soil Analysis, Agricultural Experiment Station.

B. S., Pennsylvania State College, 1912; Chemist, Armour and Company, Chicago, Ill., 1912-'14; Assistant in Soil Analysis, Agricultural Experiment Station, Kansas State Agricultural College, November 17, 1914—.
Office C 3; Res. 514 Leavenworth St.

1. Resigned.

4. In cooperation with the United States Department of Agriculture.

LOUIS COLEMAN WILLIAMS, B. S.,

Assistant to Superintendent of Institutes and Demonstrations, Division of College Extension.

B. S., Kansas State Agricultural College, 1912; Instructor in Agriculture, Tecumseh (Nebr.) High School, 1913-'15; Assistant to Superintendent of Institutes and Demonstrations, Division of College Extension, Kansas State Agricultural College, July 1, 1915—.
Office A 34; Res. 1110 Vattier St.

AVA PATRICIA ABERNETHY,

Assistant in Piano.

Graduate, Laurence Conservatory, Appleton, Wis., 1911; Graduate Student, *ibid.*, 1911-'12; Pupil of Emil Liebling and Edgar A. Brazilton, Chicago, Ill., 1911-'12; Instructor in Piano, Evansville (Ind.) Conservatory of Music, 1912-'13; Instructor in Piano and Professional Accompanist, Lyceum Arts Conservatory, Chicago, Ill., 1913-'15; Assistant in Piano, Kansas State Agricultural College, 1915—.
Office M 53; Res. 624 Poyntz Ave.

JANE CAPE, B. S.,

Assistant in Domestic Science.

B. S., University of Wisconsin, 1914; Instructor in Chemistry, North Carolina State College, 1914-'15; Assistant in Domestic Science, Kansas State Agricultural College, 1915—.
Office L 35; Res. 421 N. Sixteenth St.

HUGH DURHAM, A. M.,

Assistant to the Dean of the Division of Agriculture.

Graduate, Kansas State Normal School, 1901; A. B., University of Kansas, 1909; A. M., *ibid.*, 1915; Fellow in Education, *ibid.*, 1909-'10; Student in Agriculture, Kansas State Agricultural College, 1914-'15; Rural Teacher, Jewell County, 1897-'99; Principal Norton City Schools, 1901-'02; Principal, Randall City Schools, 1902-'03; County Superintendent, Jewell County, 1903-'07; Superintendent, Dodge City Schools, 1910-'12; Superintendent Caldwell Schools, 1912-'14; Instructor and Conductor in County Teachers' Institutes, 1903—; Assistant to the Dean of the Division of Agriculture, Kansas State Agricultural College, 1915—.
Office Ag 30; Res. 730 Osage St.

MABEL WINIFRED FORTNEY,¹*Specialist in Domestic Art, Extension Schools, Division of College Extension.*

Teacher, Public Schools of Pennsylvania and New York, 1897-1904; Trade Dress-making and Tailoring, Philadelphia, Pa., 1904-'05, '06, and '13; Diploma, School of Design and Parisian Academy, *ibid.*, 1906; Diploma in Domestic Art, Drexel Institute, 1908; Teacher of Evening Settlement Classes, Philadelphia, Pa., 1907-'08; Special Student in Household Arts, Teachers' College, Columbia University, 1909-'10; Teacher of Sewing Classes, Union Settlement, New York City, 1909-'10; Director of Home Arts Work, Idaho State Academy, 1912; Certificate in Domestic Science, Pennsylvania State College, Summer, 1912; Student, *ibid.*, 1913; Designer of Millinery, Albuquerque, N. M., 1914; Assistant in Domestic Art, Kansas State Agricultural College, 1910-'11; Specialist in Domestic Art, Extension Schools, Division of College Extension, *ibid.*, 1915-Dec. 31, 1916.

MILDRED PEARL FRENCH,

Assistant in Domestic Art.

Graduate, Pratt Institute, 1915; Student, Idaho State Normal School, Summers, 1910 and '11; Teacher, Idaho Public Schools, 1910-'12; Student, University of Idaho, 1912-'13; Instructor in Dietetics, Sanitarium, Baltimore, Md., Summer, 1914; Instructor in Y. W. C. A. and Settlement Work, New York City, 1914-'15; Assistant in Domestic Art, Kansas State Agricultural College, 1915—.
Office L 66; Res. 831 Leavenworth St.

1. Resigned.

DAVID GRAY, B. S.,

Assistant in Animal Husbandry.

B. S., Kansas State Agricultural College, 1914; in Charge Experimental Cattle Feeding, *ibid.*, 1915; Assistant in Animal Husbandry, *ibid.*, 1915—.
Office Ag 13; Res. 617 Houston St.

MARION GREENLEAF KIRKPATRICK, B. S., PH. D.,

Assistant in Home Study Service, Division of College Extension.

B. S., Kansas State Agricultural College, 1915; Ph. D., Highland University, 1907; Student, Campbell College, 1889-'93; Admitted to the Bar, Leavenworth, 1894; Teachers' Life Certificate for Kansas, 1910; Teacher, Kansas Rural Schools, three years; Superintendent, Vermillion City Schools, 1899-1902; Superintendent, Frankfort City Schools, 1902-'14; Conductor of Teachers' Normal Institutes, 1904-'15; Member, State Normal Training Examining Board, 1910 and '11; Assistant in Home Study Service, Division of College Extension, Kansas State Agricultural College, 1915—.
Office A 5; Res. 1000 Kearney St.

EDGAR TALBERT KEITH, B. S.,

Assistant in Printing.

B. S., Kansas State Agricultural College, 1912; with Department of Printing, *ibid.*, July, 1912-'15; Assistant in Printing, *ibid.*, 1915—.
Office K 1; Res. 1421 Poyntz Ave.

ETHEL MAY LORING,

Assistant in Physical Education for Women.

Graduate, Sargent Normal School of Physical Education, 1915; Director of Playground, Newton Center, Mass., 1912-'15; Assistant in Physical Education for Women, Kansas State Agricultural College, 1915—.
Office N 1; Res. 1646 Fairchild Ave.

JOHN ROBINSON McCLUNG, A. M.,

Assistant in Bacteriology.

B. S., Kansas State Agricultural College, 1910; A. M., University of the South, 1913; Student, Northwestern University Medical School, Fall, 1911; Instructor in Science, Sewanee (Tenn.) Military Academy, January 1, 1912-'15; Assistant in Chemistry, University of the South, Summer, 1914; Assistant in Chemistry, Kansas State Agricultural College, 1915-Jan. 1, 1917; Assistant in Bacteriology, *ibid.*, Jan. 1, 1917—.
Office V 26; Res. 1628 Laramie St.

ARTHUR ERSKINE McCLYMONDS,¹ B. S.,*Assistant in Agronomy.*

B. S. in Agronomy, Kansas State Agricultural College, 1915; Student Assistant in Experimental Work, *ibid.*, 1914-'15; Assistant in Agronomy, *ibid.*, 1915-Dec. 15, 1916.

ISABEL PAUL MARCH, A. B.,

Loan Assistant in Library.

A. B., Washburn College, 1915; General Librarian, *ibid.*, Summer, 1915; Loan Assistant in Library, Kansas State Agricultural College, 1915—.
Office F 30; Res. 1026 Vattier St.

KURT PEISER,¹ M. S.,*Assistant in Bacteriology.*

B. S., Michigan Agricultural College, 1914; M. S., *ibid.*, 1915; Graduate Student and Student Assistant, *ibid.*, 1914-'15; Assistant in Bacteriology, Kansas State Agricultural College, 1915-Jan. 1, 1917.

MARY ALICE POULTER, B. S.,

Specialist in Home Economics, Division of College Extension.

B. S., University of Wisconsin, 1915; Graduate, River Falls (Wis.) State Normal School, 1911; Principal, State Graded School, Cumberland, Wis., 1911-'12; Assistant in Agricultural Bacteriology, University of Wisconsin, Second Semester, 1914-'15; Specialist in Home Economics, Division of College Extension, Kansas State Agricultural College, 1915—.
Office A 36; Res. 901 Laramie St.

1. Resigned.

HARPER FYLER ZOLLER,¹ M. S.,*Assistant in Chemistry.*

B. S., Lenox College, 1910; M. S., University of Illinois, 1918; Research Assistant in Astronomy, *ibid.*, 1911-'13; Assistant in Chemistry, *ibid.*, 1913; Professor of Chemistry and Physics, College of Puget Sound, 1914-'15; Assistant in Chemistry, Kansas State Agricultural College, 1915-May 30, 1917.

JAMES PHILIP CAVANAGH,

Assistant in Heat and Power.

Farmer and Thresher, 1890-1911; Motorman, Topeka Street Railway Co., 1911-'12; Fireman and Steam Fitter, Kansas State Agricultural College, 1912-'15; Assistant in Heat and Power, *ibid.*, Oct. 1, 1915—
Office E 3; Res. 1113 Bertrand St.

ROBERT SCHMIDT, B. S.,

Assistant in Botany; Seed Analyst, Agricultural Experiment Station.

B. S., Rutgers College, 1912; Assistant in Botany, New Jersey Agricultural Experiment Station, 1912; Assistant Seed Analyst, *ibid.*, 1913-'15; Assistant in Botany and Seed Analyst, Agricultural Experiment Station, Kansas State Agricultural College, Nov. 1, 1915—
Office H 54; Res. 1615 Anderson Ave.

CHARLES LORIN QUEAR,

Assistant in Office of the President.

Student, Marion (Ind.) Normal College, 1908-'09; Field Manager, Guaranteed Seed Co., Plano, Ill., 1910-'11; Student, Purdue University, 1912; Instructor in Charge of Agricultural Department, Muncie (Ind.) Normal College, 1913-'16; Assistant in Office of the President, Kansas State Agricultural College, April 15, 1916—
Office A 32; Res. 900 Vattier St.

DE HELLIK BRANSON,⁹ A. M.,*Assistant in Animal Husbandry.*

B. S. Agr., Kansas State Agricultural College, 1913; A. M., University of Missouri, 1916; Assistant in Animal Husbandry, Kansas State Agricultural College, Jan. 15, 1916—
March 31, 1917.
Office Ag. 13; Res. 904 Bluemont Ave.

JAMES HENDRIX MCADAMS, B. S.,

Assistant in Farm Extension and Accounting, Fort Hays Branch Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1916; Assistant in Farm Extension and Accounting, Fort Hays Branch Agricultural Experiment Station, *ibid.*, June, 1916—
Office and Res., Hays, Kansas.

JOHN HARRIS,⁹ D. V. M.,*Specialist in Hog Cholera Eradication, Division of College Extension.*

D. V. M., Kansas State Agricultural College, 1913; Laboratory Supervisor, Johnson and Co., Franklin, Ind., 1913; Veterinarian in Charge of Anti-Hog Cholera Serum Production, Great Western Serum Co., Chicago, Ill., 1914-'16; Specialist in Hog-Cholera Eradication, Division of College Extension, Kansas State Agricultural College, Aug. 3, 1916-April 1, 1917.
Office and Res., Havensville, Kansas.

WALTER ALBERT BUCK, M. S.,

Assistant in Steam and Gas Engineering.

B. S. in Electrical Engineering, Kansas State Agricultural College, 1913; M. S. in Mechanical Engineering, *ibid.*, 1916; Graduate Student, *ibid.*, 1913-'14; Steam Turbine Research Work, General Electric Company, June to Nov., 1914; Fellow in Engineering, Kansas State Agricultural College, Nov., 1914-'16; Assistant in Steam and Gas Engineering, *ibid.*, 1916—
Office E 32; Res. 1419 Laramie St.

1. Resigned.

9. Temporary appointment.

MABEL GERTRUDE BAXTER,

Assistant in the Library.

Student, Kansas State Agricultural College, 1902-'04; Assistant in the Library, *ibid.*, 1916—.

Office F 31; Res. 1624 Fairchild Ave.

FRED HARRISON BUNDY,

Assistant in Blacksmithing.

Apprentice in Shops, Kansas State Agricultural College, 1909-'13; Machinist in Millard Machine Shop and Garage, Manhattan, 1913 - Aug. 1, 1915; Blacksmith, Kansas State Agricultural College, Aug. 1, 1915-'16; Assistant in Blacksmithing, *ibid.*, 1916—.

Office S 38; Res. 1008 Ratone St.

FLORENCE ELIZABETH BYRD,¹*Assistant in Boys' and Girls' Club Work, Division of College Extension.*

Student, Teachers' School of Training, Valparaiso University, 1906-'07; Teacher, Public Schools of Indiana, 1907-'11; Student, Stout Institute, 1911-'13; Supervisor of Domestic Science and Art, Greencastle (Ind.) High School, 1913-'14; Teacher of Domestic Art, Technical and Manual Training High Schools, Indianapolis, Ind., 1914-'1915; Organizer and Instructor of Home Economics Department, De Pauw University, Summer, 1915, and year 1915-'16; Student, University of Wisconsin, Summer, 1916; Assistant in Boys' and Girls' Club Work, Division of College Extension, Kansas State Agricultural College, 1916 - Jan. 23, 1917.

WILLIAM CECIL CALVERT, B. S.,

Assistant in Plant Propagation; Greenhouse Foreman.

B. S. in Horticulture, Kansas State Agricultural College, 1916; Assistant in Plant Propagation and Greenhouse Foreman, *ibid.*, 1916—.

Office H 33; Res. College Greenhouse.

JOHN ANDREW DAWSON,

Assistant in Shop Practice.

Inspector, Oakland Motor Car Co., Pontiac, Mich., 1911; Apprentice Tool Maker, General Motors Truck Co., *ibid.*, 1913; Graduate, Stout Institute, 1915; Tool Maker, Wilson Machine and Foundry Co., Pontiac, Mich., 1916; Assistant in Shop Practice, Kansas State Agricultural College, 1916—.

Office S 32; Res. 611 N. Sixteenth St.

ARMIN MEREDITH DOERNER, B. S.,

Assistant in Landscape Gardening.

B. S. in Agr., Oregon Agricultural College, 1916; Assistant in Landscape Gardening, Kansas State Agricultural College, 1916—.

Office H 32; Res. 1621 Anderson Ave.

ARTHUR DOUGLAS,

Assistant in Shop Practice.

Student, Kansas State Agricultural College, 1911-'15; Teacher of Boys' Vocational Work, Lincoln (Neb.) Public Schools, 1915-'16; Assistant in Shop Practice, Kansas State Agricultural College, 1916—.

Office S 26; Res. 501 Kearney St.

LESTER HENRY DRAYER,

Assistant in Heat and Power.

Farmer and Pump Repairer, 1892-1910; Student, Kansas State Agricultural College, 1910-'16; Steam Fitter and Plumber, *ibid.*, 1912-'14; Assistant in Steam Traction Engines, *ibid.*, Winter, 1914; Boiler Room Foreman, *ibid.*, 1915-'16; Assistant in Heat and Power, *ibid.*, 1916—.

Office E 3; Res. 1201 Kearney St.

1. Resigned.

CECIL ELDER,⁹ D. V. M.,

Assistant in Pathology.

D. V. M., Kansas State Agricultural College, 1916; Student Assistant in Pathology, *ibid.*, 1915-'16; Assistant in Pathology, *ibid.*, 1916-'17.
Office V 56; Res. College Hill, R. R. 8.

FRANK ELMER FOX, B. S.,

Assistant in Poultry Husbandry.

B. S., Iowa State College, 1915; Superintendent of Poultry Farm, *ibid.*, 1912-'13; Student Assistant, *ibid.*, 1913-'15; Assistant in Poultry Husbandry, Kansas State Agricultural College, 1916—
Office Ag 38; Res. 1821 Poyntz Ave.

WANDA MARGUERITE KIRKBRIDE, B. S.,

Assistant in Botany.

B. S., Ohio State University, 1915; Graduate Student in Botany, Columbia University, 1915-'16; Instructor in Botany, Ohio State University, Summer, 1916; Assistant in Botany, Kansas State Agricultural College, 1916—
Office H 57; Res. 1645 Fairchild Ave.

WALTER GEORGE KNICKERBOCKER,¹ B. S.,

Assistant in Steam and Gas Engineering.

B. S. in Engineering, Michigan Agricultural College, 1916; Draftsman, Dort Motor Car Company, Flint, Mich., Summer, 1916; Assistant in Steam and Gas Engineering, Kansas State Agricultural College, 1916 - March 30, 1917.

ALFRED ERNEST LAWSON,¹ B. S.,

Assistant in Animal Husbandry.

B. S., Kansas State Agricultural College, 1916; Assistant in Animal Husbandry, *ibid.*, Sept. 1 - Dec. 1, 1916.

MARTHA MATTIE McDONALD, Ph. B.,

Assistant in Domestic Art.

Ph. B. in Education, University of Chicago, 1916; Graduate Eastern Illinois State Normal School, 1910; Graduate, Bradley Polytechnic Institute, 1912; Instructor in Manual Training and Domestic Science, Belle Plaine (Iowa) Public Schools, 1912-'16; Assistant in Domestic Art, Kansas State Agricultural College, 1916—
Office L 64; Res. 1415 Fairchild Ave.

MYRA O'BRIEN, A. B., B. L. S.,

Reference Assistant in the Library.

A. B., Knox College, 1906; B. L. S., University of Illinois, 1907; Periodical Assistant in Library, *ibid.*, 1908-'10; Order Assistant in Library, University of Chicago, 1911-'13; in Charge of History Reading Room, *ibid.*, 1914-'15; Reference Assistant in Library, Kansas State Agricultural College, 1916—
Office F 32; Res. 1645 Fairchild Ave.

DORA MARIE OTTO, B. S.,

Research Assistant to the Director of the Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1911; Teacher of Domestic Art, Eureka (Utah) High School, 1913-'14; Assistant Principal, Riley High School, 1914-'15; Graduate Student in Journalism, Kansas State Agricultural College; 1915-'16; Research Assistant to the Director of the Agricultural Experiment Station, *ibid.*, 1916—
Office Ag 34; Res. 815 Humboldt St.

1. Resigned.

9. Temporary appointment.

JOSEPHINE CARRIER PERRY, B. S.,

Assistant in Domestic Science.

B. S., Simmons College, 1914; Instructor in Household Economics, College of Sisters of Bethany, 1915; Instructor in Household Economics, Deerfield (Mass.) Academy, 1915-'16; Assistant in Domestic Science, Kansas State Agricultural College, 1916—. Office L 34; Res. 303 N. Sixteenth St.

KARL WHITE REED, A. M.,

Assistant in Chemistry.

A. B., Miami University, 1913; A. M., Ohio State University, 1916; Student Assistant in Chemistry, Miami University, 1911-'13; Instructor in Chemistry, *ibid.*, Summer, 1913; Teacher of Physics and Chemistry, Oskaloosa (Iowa) High School, 1913-'14; Graduate Assistant in Chemistry, Ohio State University, 1914-'16; Assistant in Chemistry, Kansas State Agricultural College, 1916—. Office W 26; Res. 315 N. Sixteenth St.

LENORE RICHARDS, A. B.,

Assistant in Domestic Science; Assistant Director of Cafeteria.

A. B., University of Illinois, 1915; Assistant in Domestic Science and Assistant Director of the Cafeteria, Kansas State Agricultural College, 1916—. Office K 30; Res. 1612 Laramie St.

CHARLES HENRY SCHOLER,¹ B. S.,*Assistant State Engineer, Division of College Extension.*

B. S. in C. E., Kansas State Agricultural College, 1914; Assistant, U. S. General Land Office Surveys, Santa Fe, New Mexico, 1914-'15; Chairman, Atchison, Topeka and Santa Fe Railroad Co., Topeka, 1915; Inspector, Kansas State Agricultural College, 1915-'16; Assistant State Engineer, Division of College Extension, *ibid.*, 1916-May 1, 1917.

MINNIE SEQUIST, A. B.,

Specialist in Home Economics, Division of College Extension.

A. B., Kansas State Normal School; Student, Kansas State Agricultural College, Summer, 1912; Graduate, Stout Institute, 1916; Teacher, Kansas Public Schools, Eleven Years; Specialist in Home Economics, Division of College Extension, Kansas State Agricultural College, 1916—. Office A 36; Res. 203 Park Road.

THOMAS SYLVESTER TOWNSLEY,⁹ B. S.,*Assistant in Poultry Husbandry.*

B. S., Purdue University, 1916; Student, Indiana University, Summers, 1910 and '11; Teacher, Indiana Schools, 1910-'12; Assistant in Poultry Husbandry, Kansas State Agricultural College, 1916-'17. Office Ag 38A; Res. 1615 Anderson Ave.

FRED WALLACE CALDWELL,⁹ D. V. M.,*Specialist in Animal Husbandry, Division of College Extension.*

D. V. M., Kansas State Agricultural College, 1907; Practicing Veterinarian, Atchison, 1909-'11; President, St. Joseph (Mo.) Veterinary College, 1911-'13; President and Manager, St. Joseph Veterinary Serum Laboratories, 1912-'13; Specialist in Animal Diseases, Extension Division, University of Minnesota, 1913-'14; Proprietor Valley View Dairy, Wamego, 1915-'16; Specialist in Veterinary Medicine, Division of College Extension, Kansas State Agricultural College, Aug. 14-Oct. 15, 1916; Specialist in Animal Husbandry, Division of College Extension, *ibid.*, Oct. 15, 1916-March 1, 1917.

FRANK SIMON HAGY,⁹ B. S.,*Specialist in Soils and Crops, Division of College Extension.*

B. S., Ohio Northern University, 1901; B. S. in Agriculture, Kansas State Agricultural College, 1916; Superintendent of Schools at Fall River, Bunkerhill, Conway Springs, and Norwich, 1902-'13; Instructor in Summer Institute, 1904-'10; Graduate Student, University of Chicago, Summer, 1912; Specialist in Soils and Crops, Division of College Extension, Kansas State Agricultural College, Nov. 1, 1916-Feb. 28, 1917.

1. Resigned.

9. Temporary appointment.

EBEN HENRY TOOLE, A. M.,*Assistant in Botany.*

A. B., University of Wisconsin, 1915; A. M., *ibid.*, 1916; Graduate Student, University of Chicago, Summer, 1916; Graduate Student, University of Wisconsin, Fall, 1916; Assistant in Botany, University of Wisconsin, 1915-'16; Assistant in Botany, Kansas State Agricultural College, Nov. 15, 1916—
Office H 56; Res. 880 Osage St.

LAWRENCE PAUL WEHRLE,⁹ M. S.,*Assistant in Zoölogy.*

B. S., Kansas State Agricultural College, 1914; M. S., *ibid.*, 1916; Graduate Assistant in Entomology and Graduate Student, *ibid.*, 1914-'16; Assistant in Zoölogy, *ibid.*, Dec. 1, 1916-'17.
Office F 62; Res. 1623 Fairchild Ave.

JAMES WILLIAM CRUMBAKER, B. S.,*Assistant in Agronomy, Foreman of Agronomy Farm.*

B. S. in Animal Husbandry, Kansas State Agricultural College, 1916; Assistant in Agronomy and Foreman of Agronomy Farm, *ibid.*, Dec. 15, 1916—
Office and Res., Agronomy Farm, R. F. D. 8.

OSCAR WALLACE PARK, B. S.,*Assistant in Zoölogy; Assistant in Genetics, Agricultural Experiment Station.*

B. S., Kansas State Agricultural College, 1917; Student Assistant in Zoölogy, *ibid.*, 1915-'16; Assistant in Zoölogy and Assistant in Genetics in Agricultural Experiment Station, *ibid.*, Jan. 1, 1917—
Office F 59; Res. 1200 Bertrand St.

JOSEPH PRESTWICH SCOTT, D. V. M.,*Assistant in Veterinary Medicine.*

Bachelor es Sciences, Gymnase Scientifique, Lausanne, Switzerland, 1910; D. V. M., Ohio State University, 1914; Research Work in Department of Physiology, Medical School, University of Manchester, 1914-'15; Graduate Scholar, Cornell University, 1915-'16; Fellow in Pathology, Kansas State Agricultural College, Nov. 1-Dec. 31, 1916; Assistant in Veterinary Medicine, *ibid.*, Jan. 1, 1917—
Office V 32; Res. 843 N. Fifteenth St.

FRANK WILLIAMSON KIRK,*Agent for Negro Farmers, Division of College Extension.*

Graduate, Department of General Agriculture, Langston (Okla.) University, 1913; Superintendent of Vegetable Growing and Forcing, Danson Produce Co., Oklahoma City, Okla., 1914-'16; Certified Milk and Cream Tester, Oklahoma State Board of Agriculture, 1915; Agent for Negro Farmers, Division of College Extension, Kansas State Agricultural College, Feb. 15, 1917—
Office A 85; Res. 618 Yuma St.

MOSES NAPHTALI LEVINE, M. S.,*Assistant in Plant Pathology.*

B. S. in Agriculture, University of Minnesota, 1915; M. S., *ibid.*, 1916; Assistant in Plant Pathology, Minnesota Agricultural Experiment Station, 1915-'17; Graduate Student, University of Minnesota, 1915—; Collaborator, Federal Horticultural Board, U. S. Department of Agriculture, Winter, 1916; Agent, Office of Cereal Investigations, Bureau of Plant Industry, U. S. Department of Agriculture, 1917—; Assistant in Plant Pathology, Kansas State Agricultural College, March 1, 1917—
Office H 56A; Res. 325 N. Seventeenth St.

⁹. Temporary appointment.

SUPERINTENDENTS

STANLEY PENRHYN CLARK, B. S.,

Superintendent, Colby Branch Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1912; Teacher, Nashwauk (Minn.) High School, 1912-March 1, 1914; Superintendent, Colby Branch Agricultural Experiment Station, March 1, 1914—.

Office and Res., Colby, Kansas.

CHARLES ELMER CASSEL, B. S.,

*Superintendent, Tribune Branch Agricultural Experiment Station.*B. S., Kansas State Agricultural College, 1910; Foreman, Tribune Branch Agricultural Experiment Station, *ibid.*, 1912-'14; Superintendent, *ibid.*, 1914—.

Office and Res., Tribune, Kansas.

GEORGE SELICK KNAPP, B. S.,

*Superintendent, Garden City Branch Agricultural Experiment Station.*B. S. in M. E., Kansas State Agricultural College, 1914; Assistant in Machine Shops, Highland Park College, 1908-'10; Instructor in Mechanical Drawing, Simpson College, 1911-'12; Assistant in Gas Engineering, Kansas State Agricultural College, 1913-'14; Agent, Irrigation Investigations, U. S. Department of Agriculture, 1914; Acting Superintendent, Garden City Branch Agricultural Experiment Station, Kansas State Agricultural College, Dec. 1, 1915-April 1, 1916; Superintendent, *ibid.*, April 1, 1916—.

Office and Res., Garden City, Kansas.

MARION W. KIRKPATRICK,

Superintendent, Dodge City Branch Agricultural Experiment Station.

Superintendent, Dodge City Branch Agricultural Experiment Station, Kansas State Agricultural College, April 1, 1916—.

Office and Res., Dodge City, Kansas.

AGRICULTURAL AGENTS

PLEASANT ELIJAH CRABTREE,

*District Demonstration Agent, Western Kansas, Division of College Extension.*Student, Fort Scott Normal Institute, 1885; Student, Lamar (Mo.) Normal Institute, 1885-'89; Teacher, Missouri Public Schools, 1886-'89; Student, Denver Business College, 1897; Editor, *Agricultural and Live Stock Herald*, Denver, 1897-1900; Lecturer, Missouri Farmers' Institutes, 1900-'04; Specialist in Farm Management, Division of College Extension, Kansas State Agricultural College, 1908-Jan. 1916; District Agricultural Agent, Division of College Extension, *ibid.*, Jan. 1, 1916—.

Office and Res., Scott City, Kansas.

WILLIAM ARMFIELD BOYS, B. S.,

District Demonstration Agent, West Central Kansas, Division of College Extension.

B. S., Kansas State Agricultural College, 1904; Farmer, Lee's Summit, Mo., 1904-'06; Farmer, Goodland, Kan., 1906-'11; Assistant Cerealist, University of California, 1911-'12; District Demonstration Agent, West Central Kansas, Division of College Extension, Kansas State Agricultural College, Oct. 1912—.

Office and Res., Hays, Kansas.

LEE HAM GOULD,¹ B. S.,*District Demonstration Agent, Southwest Kansas, Division of College Extension.*

B. S., Kansas State Agricultural College, 1912; Farm Manager and Grain Buyer for W. H. Gould and Sons, 1912-'13; District Demonstration Agent, Southwest Kansas, Division of College Extension, Kansas State Agricultural College, Oct. 1, 1913-July 1, 1917.

¹. Resigned.

CARL G. ELLING, B. S.,

District Demonstration Agent, Southeast Kansas, Division of College Extension.

B. S., Kansas State Agricultural College, 1904; Graduate Student, *ibid.*, June to Oct., 1904; Assistant in Department of Animal Husbandry, Santiago de las Vegas, Cuba, 1904-'07; Assistant in Animal Husbandry, Kansas State Agricultural College, 1907-'09; in Charge of Live Stock Department on Sugar Plantation, Constancia, Cuba, 1909-'11; Farmer and Stockman, 1911-'14; District Demonstration Agent for Southwest Kansas, Division of College Extension, Kansas State Agricultural College, 1914—.
Office and Res., Parsons, Kansas.

CHARLES HENRY TAYLOR,⁷ B. S. A.,

Atchison County Agricultural Agent, Division of College Extension.

B. S. A., University of Missouri, 1908; Stock and Fruit Farmer, Shubert, Nebr., March, 1909-Dec., 1913; Lecturer on Animal Husbandry, Division of College Extension, Kansas State Agricultural College, Jan. 1, 1914-Feb. 1, 1915; Atchison County Agricultural Agent, Division of College Extension, *ibid.*, Jan. 1, 1915—.
Office and Res., Effingham, Kansas.

FRANK PALMER LANE,⁷ B. S.,

Harvey County Agricultural Agent, Division of College Extension.

B. S., Oklahoma College of Agriculture and Mechanic Arts, 1913; Graduate, Kansas State Normal School, 1904; Superintendent, Grenola Public Schools, 1905-'06; Superintendent, Cleveland (Okla.) Public Schools, 1907-'11; Harvey County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, 1913—.
Office and Res., Newton, Kansas.

EVEREST JOHN MACY,⁷ B. S.,

Montgomery County Agricultural Agent, Division of College Extension.

B. S., Earlham College, 1904; Teacher, Indiana Public Schools, 1900-'01; Field Assistant, U. S. Geological Survey, Summer, 1903; Teacher, Westfield (Ind.) High School, 1904-'07; Assistant Chemist, Florida Agricultural Experiment Station, 1907-'08; Instructor in Science, Rochester (Ind.) College, 1908-'09; Instructor in Chemistry and Physics, Kokomo (Ind.) High School, 1909-'10; Principal, Westfield (Ind.) Academy, 1910-'11; Teacher of Science, Scott County High School, 1911-'13; Montgomery County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, 1913—.
Office and Res., Independence, Kansas.

WARREN ELMER WATKINS,¹ B. S.,

Allen County Agricultural Agent, Division of College Extension.

B. S., Kansas State Agricultural College, 1906; Dairy Work, Butte, Mont., 1907; General Farming, 1907-'10; Graduate Student, University of Colorado, 1910-'11; with Department of Entomology, Kansas State Agricultural College, 1912-'13; Allen County Agricultural Agent, Division of College Extension, *ibid.*, 1913-Feb. 15, 1917.

AMBROSE DICKSON FOLKER,⁷ B. S.,

Jewell County Agricultural Agent, Division of College Extension.

B. S., Iowa State College, 1911; Farmer, Clark County, Mo., 1911-'13; Jewell County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, 1914—.
Office and Res., Mankato, Kansas.

OTTO C. HAGANS,⁷ B. S.,

Miami County Agricultural Agent, Division of College Extension.

B. S., Kansas State Agricultural College, 1911; Instructor in Agriculture and Science, Atchison County High School, 1912-'14; Miami County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, 1914—.
Office and Res., Paola, Kansas.

1. Resigned.

7. The U. S. Department of Agriculture and the Farm Bureau of the county cooperating.

HUBERT LOWELL POPENOE,⁷ B. S.,*Lyon County Agricultural Agent, Division of College Extension.*

B. S., Kansas State Agricultural College, 1909; Farmer and Stockman, 1909-'12; Director in Agriculture, State High School, Alexandria, Minn., 1912-'14; Lyon County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, 1914—.

Office and Res., Emporia, Kansas.

JACOB CLAUDE HOLMES,¹ B. S.,*Cowley County Agricultural Agent, Division of College Extension.*

B. S., Kansas State Agricultural College, 1913; Teacher, Southern Kansas Academy, and Ranch Manager, Eureka, 1913-'15; Cowley County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, Aug. 1, 1915 - Dec. 31, 1916.

KARL KNAUS,⁷ B. S.,*Cloud County Agricultural Agent, Division of College Extension.*

B. S., Kansas State Agricultural College, 1914; Farmer, Benedict, 1914-'15; Cloud County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, Jan. 10, 1916—.

Office and Res., Concordia, Kansas.

VALENTINE MEACHAM EMMERT,⁷ B. S.,*McPherson County Agricultural Agent, Division of College Extension.*

B. S., Kansas State Agricultural College, 1901; Farmer, Blue Rapids, 1901-'09; Farmer, Brogado, Texas, 1908-'12; Student, Minnesota Agricultural College, Summer, 1913; Principal, Doran (Minn.) Consolidated Schools, 1913-'14; Teacher of Agronomy, Buffalo (Minn.) High School, 1914-'16; McPherson County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, April 1, 1916—.

Office and Res., McPherson, Kansas.

RAYMOND OLIVER SMITH,⁷ B. S.,*Wilson County Agricultural Agent, Division of College Extension.*

B. S. in Agriculture, University of Nebraska, 1915; Student Assistant in Experiment Station, *ibid.*, Summers, 1913 and 1914; Teacher of Agriculture, Geneva (Nebr.) High School, 1915 - April, 1916; Wilson County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, April 6, 1916—.

Office and Res., Fredonia, Kansas.

JOHN D. LEWIS,⁷ B. S.,*Nemaha County Agricultural Agent, Division of College Extension.*

B. S., Pennsylvania State College, 1912; Graduate, Edinboro (Pa.) State Normal School, 1906; Teacher, Pennsylvania Public Schools, 1906-'07; Assistant in Animal Husbandry, Kansas State Agricultural College, 1912-'14; Instructor in Animal Husbandry, *ibid.*, Sept. 1 to Dec. 1, 1914; Livestock Agent, U. S. Department of Agriculture, 1914 - June 1, 1916; Nemaha County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, June 1, 1916—.

Office and Res., Seneca, Kansas.

RALPH POWELL SCHNACKE,⁷ B. S.,*Pawnee County Agricultural Agent, Division of College Extension.*

B. S. in Agriculture, Kansas State Agricultural College, 1916; Student, Washburn College, 1903-'05; Farmer, Stafford and Barton Counties, 1905-'13; Draftsman and Transitman, A. T. & S. F. Railway, 1913-'14; Pawnee County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, June 20, 1916—.

Office and Res., Larned, Kansas.

1. Resigned.

7. The U. S. Department of Agriculture and the Farm Bureau of the county cooperating.

FRANCIS BUCKNER WILLIAMS,⁷ B. S.,*Marshall County Agricultural Agent, Division of College Extension.*

B. S. in Agriculture, Kansas State Agricultural College, 1909; on Fruit Ranch, Etiwanda, Cal., 1909-'11; Manager, Lomacitos Ranch, San Dimas, Cal., 1911-'13; Manager, Claremont Heights Development Co., Cal., 1913-'16; Marshall County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, June 20, 1916—.

Office and Res., Marysville, Kansas.

IRA NICHOLS CHAPMAN,⁷ B. S.,*Leavenworth County Agricultural Agent, Division of College Extension.*

B. S., Kansas State Agricultural College, 1916; Teacher, Geary County and Riley County Public Schools, 1897-1914; Leavenworth County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, 1916—.

Office and Res., Leavenworth, Kansas.

PRESTON ORIN HALE,⁷ B. S.,*Chase County Agricultural Agent, Division of College Extension.*

B. S., Kansas State Agricultural College, 1916; Student Assistant in Feeding Experiments, *ibid.*, 1915-'16; Manager, George A. Bond Stock Farm, Pleasant Hill, Mo., six months; Chase County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, Feb. 1, 1917—.

Office and Res., Cottonwood Falls, Kansas.

RAYMOND WALTER SCHAFER,⁷ M. S.,*Washington County Agricultural Agent, Division of College Extension.*

B. S., Kansas State Agricultural College, 1914; M. S., University of Wisconsin, 1917; in Charge of Livestock, Fort Hays Branch Agricultural Experiment Station, Kansas State Agricultural College, five months, 1914-'15; Assistant Superintendent of a Colorado Ranch, one year; Graduate Student, University of Wisconsin, 1915-'16; Assistant in Farm Management Demonstration Work, Division of College Extension, Kansas State Agricultural College, Sept. 5, 1916-Jan. 31, 1917; Washington County Agricultural Agent, *ibid.*, Feb. 1, 1917—.

Office and Res., Washington, Kansas.

WILLIAM RENWICK CURRY,⁷ B. S.,*Doniphan County Agricultural Agent, Division of College Extension.*

B. S., Kansas State Agricultural College, 1914; Farm Manager, Feb. 20-Sept. 6, 1915; Teacher of Agriculture, Lewis High School, 1915-'16; Teacher of Agriculture, Cottonwood Falls High School, 1916-March, 1917; Doniphan County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, March 15, 1917—.

Office and Res., Troy, Kansas.

ALFRED LESTER CLAPP,⁷ B. S.,*Morris County Agricultural Agent, Division of College Extension.*

B. S., Kansas State Agricultural College, 1914; Foreman of Agronomy Farm, *ibid.*, 1914-'15; Farmer, 1915-'16; Teacher in High School, Castle Rock, Colo., 1916-'17; Morris County Agricultural Agent, Kansas State Agricultural College, April 1, 1917—.

Office and Res., Council Grove, Kansas.

FELLOWS**CLIFF ERRETT AUBEL, B. S.,***Fellow in Animal Husbandry.*

B. S., Pennsylvania State College, 1915; Fellow in Animal Husbandry, Kansas State Agricultural College, 1915—.

Office Ag 15; Res. 511 N. Fourteenth St.

7. The U. S. Department of Agriculture and the Farm Bureau of the county cooperating.

LORENZO BECKLEY MANN,¹ B. S. A.,

Fellow in Animal Husbandry.

B. S. A., Kansas State Agricultural College, 1915; Fellow in Animal Husbandry, *ibid.*, 1915-March 1, 1917.

CLYDE WILLIAM MULLEN,¹ B. S.,

Fellow in Cereal Crops.

B. S., Oklahoma Agricultural and Mechanical College, 1915; Fellow in Cereal Crops, Kansas State Agricultural College, 1915-April 1, 1917.

HERSCHEL SCOTT, B. S. A.,

Fellow in Soils.

B. S. A., University of Kentucky, 1915; Fellow in Soils, Kansas State Agricultural College, 1915—.

Office Ag 55; Res., 1615 Anderson Ave.

ERNEST EDWARD DALE,¹ A. B.,

Fellow in Horticulture.

A. B., University of Nebraska, 1913; Graduate Student, *ibid.*, 1914-'15; Fellow in Horticulture, Kansas State Agricultural College, Nov. 1, 1915-May 8, 1917.

JOHN DEALY HUNGERFORD,¹ B. S.,

Fellow in Chemistry.

B. S., Kansas State Agricultural College, 1915; Graduate Student, *ibid.*, 1915-'16; Fellow in Chemistry, *ibid.*, July 1-Nov. 30, 1916.

CHARLES AUGUSTUS BIORKMAN, B. S.,

Fellow in Electrical Engineering.

B. S. in Elec. Engineering, Worcester Polytechnic Institute, 1916; Fellow in Electrical Engineering, Kansas State Agricultural College, 1916—.

Office C 33; Res., 307 N. Sixteenth St.

LUZERNE HALLECK FAIRCHILD, B. S.,

Fellow in Dairy Husbandry.

B. S., Kansas State Agricultural College, 1916; Fellow in Dairy Husbandry, *ibid.*, 1916—.

Office D 28; Res. 1031 Leavenworth St.

FLOYD HAWKINS,

Fellow in Debating.

Teacher, Kansas Public Schools, 1909-'11; Student, Kansas State Agricultural College, 1911—; Fellow in Debating, *ibid.*, 1916—.

Office G 56; Res., 910 Fremont St.

LEONARD SINCLAIR HOBBS,

Fellow in Engineering.

B. S. in Mechanical Engineering, Texas Agricultural and Mechanical College, 1916; Fellow in Engineering, Kansas State Agricultural College, 1916—.

Office S 55; Res., 1020 Bluemont Ave.

ALICE MAE SWEET,

Fellow in Debating.

Student, Kansas State Agricultural College, 1913—; Fellow in Debating, *ibid.*, 1916—.

Office K 27; Res., 1638 Osage St.

1. Resigned.

OTHER OFFICERS

JACOB LUND, M. S.,

Superintendent of Heat and Power.

B. S., Kansas State Agricultural College, 1883; M. S., *ibid.*, 1886; Steam Fitter and Instructor in Blacksmithing, *ibid.*, 1883-'86; Machinist, Santa Fe Railroad Shops, Topeka, 1886-'88; with Las Vegas (N. M.) Hot Springs Company, 1888-'91; General Repairer, Sidney (Wash.) Shingle Mill, 1891-'92; Engineer and Fireman, Capital Iron Works, Topeka, 1892-'93; Steam Fitter and Fireman, Kansas State Agricultural College, 1893-'98; Engineer, *ibid.*, 1898-1901; Superintendent of Heat and Power, *ibid.*, 1901—.

Office E 26; Res., 1416 Fairchild Ave.

JAMES THOMAS LARDNER,

Financial Secretary and Purchasing Agent.

Student, Kansas Normal College, Fort Scott, 1891-'93; Teacher, Kansas Public Schools, 1893-'96; Student, Kansas State Normal School, 1896-'97; Bookkeeper, Assistant Bank Cashier, and Bank Cashier, 1898-1913; Financial Secretary and Purchasing Agent, Kansas State Agricultural College, 1913—.

Office and Res., Topeka, Kansas.

JESSIE McDOWELL MACHIR,

Registrar.

Assistant Registrar, University of Kansas, Aug. 1910-'13; Registrar, Kansas State Agricultural College, 1913—.

Office A 29; Res., 1645 Fairchild Ave.

MARIE ANNA GREENE, A. M., M. D.,

Assistant College Physician.

A. B., University of Kansas, 1904; A. M., *ibid.*, 1906; M. D., *ibid.*, 1908; Fellow in Philosophy, *ibid.*, 1915; Medical Practitioner, Kansas City, Kan., and Kansas City, Mo., 1908-'14; Assistant College Physician, Kansas State Agricultural College, 1914—.

Office A 59; Res., 1725 Poyntz Ave.

GEORGE FRANKLIN WAGNER, B. S.,

Custodian.

B. S., Kansas State Agricultural College, 1899; Custodian, *ibid.*, Jan. 15, 1914—.

Office A 47; Res., 1633 Fairchild Ave.

GEORGE RICHARD PAULING,

Engineer of Power Plant; Superintendent of Buildings and Repairs.

Oilier in Power Plant, Metropolitan Street Railway, Kansas City, Mo., 1900-'01; Switchboard Operator, *ibid.*, 1901-'03; Construction Work, General Electric Company, 1903-'04; Student in Night School, Finley Engineering College, 1905-'06; Assistant Engineer of Power Plant, Metropolitan Street Railway, Kansas City, Mo., 1904-'08; Night Engineer, Missouri River Power Plant, *ibid.*, 1908-'11; Chief Engineer, *ibid.*, 1911-'13; Engineer of Power Plant, Kansas State Agricultural College, Nov. 1, 1913—; Superintendent of Buildings and Repairs, *ibid.*, 1916—.

Office E 27; Res. 1021 Fremont St.

Agricultural Experiment Station

Officers of the Station

H. J. WATERS, *President of the College.*

ADMINISTRATION—

W. M. JARDINÉ, Director.
J. T. WILLARD, Vice Director.
J. T. LARDNER, Financial Secretary.
DORA M. OTTO, Research Assistant.

AGRONOMY—

L. E. CALL, in Charge.
CECIL SALMON, Crops.
C. C. CUNNINGHAM, Coöperative Experiments.
B. S. WILSON, Coöperative Experiments.
R. I. THROCKMORTON, Soils.
W. E. GRIMES, Farm Management.
RALPH KENNEY, Crops.
M. C. SEWELL, Soils.
R. K. BONNETT, Crops.
J. W. CRUMBAKER, Farm Foreman.

ANIMAL HUSBANDRY—

W. A. COCHEL, in Charge.
E. N. WENTWORTH, Animal Breeding.
C. W. McCAMPBELL, Horse Feeding Investigations.
C. M. VESTAL, Animal Nutrition.
A. M. PATERSON, Beef Cattle.
RAY GATEWOOD, Beef Cattle.
E. VANDERWILT, Experimental Records.
R. W. KISER, Superintendent of Land and Live Stock.

BACTERIOLOGY—

L. D. BUSHNELL, in Charge.
O. W. HUNTER, Dairy Bacteriology.
J. G. JACKLEY, Poultry Disease Investigations.
GRACE GLASGOW, General Investigations.
P. T. GAINES, Soil Bacteriology.

BOTANY—

H. F. ROBERTS, in Charge.
E. C. MILLER, Plant Physiology.
L. E. MELCHERS, Plant Pathology.
ROBERT SCHMIDT, Seed Analyst.

CHEMISTRY—

J. T. WILLARD, in Charge.
C. O. SWANSON, General Investigations.
R. C. WILEY, Feeding Stuffs and Fertilizer Analysis.
A. G. HOGAN, Animal Nutrition.
E. L. TAGUE, Protein Investigations.
W. L. LATSHAW, Soil Analysis.
H. F. ZOLLER, Analyst Proprietary Stock Remedies.

DAIRY HUSBANDRY—

O. E. REED, in Charge.
J. B. FITCH, Dairy Production.
W. E. TOMSON, Dairy Manufactures.
N. E. OLSON, Dairy Manufactures.
G. S. HINE, State Dairy Commissioner.
H. M. JONES, Deputy State Dairy Commissioner.
CHARLES WILSON, Herdsman.

ECONOMICS—

THEODORE MACKLIN, Agricultural Economics.

ENTOMOLOGY—

G. A. DEAN, in Charge.
J. H. MERRILL, Fruit Insect Investigations.
J. W. MCCOLLOCH, Staple Crop Insect Investigations.
W. P. HAYES, Staple Crop Insect Investigations.
M. C. TANQUARY, Staple Crop Insect Investigations.

FORESTRY—

C. A. SCOTT, State Forester, in Charge.

HORTICULTURE—

ALBERT DICKENS, in Charge.
M. F. AHEARN, Vegetables and Forcing Crops.
F. S. MERRILL, Cultural Methods and Fertilizer Investigations.

MILLING INDUSTRY—

L. A. FITZ, in Charge.
LEILA DUNTON, Wheat and Flour Investigations.
HAGAN PHLEGAR, Miller.
A. E. LANGWORTHY, Feed Control.
O. C. MILLER, Feed Control.

POULTRY HUSBANDRY—

W. A. LIPPINCOTT (Absent on leave, 1916-'17), in charge.
R. M. SHERWOOD, Acting Professor, in Charge, 1916-'17.
F. E. FOX, General Investigations.
N. L. HARRIS, Superintendent of Poultry Plant.

VETERINARY MEDICINE—

L. W. GOSS, in Charge.
C. W. HOBBS, Field Veterinarian.

ZOOLOGY—

R. K. NABOURS, in Charge.
J. E. ACKERT, Parasitology.
L. R. DICE, Injurious Mammals.

Branch Experiment Stations

FORT HAYS—

C. R. WEEKS, Superintendent.
A. L. HALLSTED, Dry Farming Investigations.
F. A. KIENE, Cereal Crop Investigations.
R. E. GETTY, Forage Crop Investigations.
E. J. MONTAGUE, Assistant to the Superintendent.
J. H. MCADAMS, Farm Extension and Accounting.
I. T. BODE, Forest Nurseryman.

GARDEN CITY—

G. S. KNAPP, Superintendent.
C. B. BROWN, Dry-land Agriculture Investigations.

DODGE CITY—

M. W. KIRKPATRICK, Superintendent.

COLBY—

S. P. CLARK, Superintendent.
J. B. KUSKA, Dry-land Agriculture Investigations.

TRIBUNE—

C. E. CASSEL, Superintendent.

Engineering Experiment Station

Officers of the Station

H. J. WATERS, *President of the College.*

ADMINISTRATION—

A. A. POTTER, Director.
LOUISE SCHWENSEN, Secretary.

APPLIED MECHANICS AND MACHINE DESIGN—

R. A. SEATON, in Charge.
W. B. WENDT, Strength of Materials.
C. E. PEARCE, Machine Design.
J. H. ROBERT, General Investigations.

ARCHITECTURE—

J. D. WALTERS, in Charge.
W. A. ETHERTON, Rural Architecture.
F. C. HARRIS, Assistant.
STANLEY A. SMITH, Assistant.

CHEMISTRY—

J. T. WILLARD, in Charge.
H. H. KING, General Investigations.

CIVIL ENGINEERING—

L. E. CONRAD, in Charge.
F. F. FRAZIER, Assistant.

ELECTRICAL ENGINEERING—

C. E. REID, in Charge.
R. G. KLOEFFLER, General Investigations.
C. A. BORKMAN, Fellow.

FARM MACHINERY—

F. A. WIRT, in Charge.
R. E. WISEMAN, Assistant.

HIGHWAY AND IRRIGATION ENGINEERING—

W. S. GEARHART,¹ in Charge of Highway Engineering.
H. B. WALKER, in Charge of Irrigation and Drainage Engineering.

1. Resigned.

PHYSICS—

J. O. HAMILTON, in Charge.
G. E. RABURN, General Investigations.

SHOP PRACTICE—

W. W. CARLSON, in Charge.
E. C. JONES, General Investigations.

STEAM AND GAS ENGINEERING—

A. A. POTTER, in Charge.
S. L. SIMMERING, General Investigations.
W. H. SANDERS, Farm Motors.
E. V. COLLINS, Farm Motors.
W. A. BUCK, Assistant.
W. G. KNICKERBOCKER, Assistant.
L. S. HOBBS, Fellow.

History of the College

The Kansas State Agricultural College had its origin in the Bluemont Central College, an institution established at Manhattan under the control of the Methodist Episcopal Church of Kansas. The charter for this sectarian institution, approved February 9, 1858, provided for the establishment of a classical college, but contained the following interesting section:

"The said association shall have power and authority to establish, in addition to the literary departments of arts and sciences, an agricultural department, with separate professors, to test soils, experiment in the raising of crops, the cultivation of trees, etc., upon a farm set apart for the purpose, so as to bring out to the utmost practical results the agricultural advantages of Kansas, especially the capabilities of the high prairie lands."

The corner-stone of the new College was laid on May 10, 1859, and instruction began about a year later. On March 1, 1861, a bill passed the legislature establishing a State university at Manhattan, the Bluemont Central College building to be donated for the purpose. This measure, however, was vetoed by Governor Robinson.

On July 2, 1862, President Lincoln signed the Morrill Act, "An act donating public lands to the several states and territories which may provide colleges for the benefit of agriculture and the mechanic arts." Section 1 of this act provides—

"That there be granted to the several states, for the purposes hereinafter mentioned, an amount of public lands to be appropriated to each state a quantity equal to 30,000 acres for each senator and representative in Congress to which the states are respectively entitled by the apportionment under the census of 1860."

Section 4 requires that the money from the sale of these lands—

"Shall constitute a perpetual fund, the capital of which shall remain forever undiminished, and the interest of which shall be inviolably appropriated by each state which may take and claim the benefit of this act, to the endowment, support and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

Because of the nature of the endowment made by Congress, the institutions founded in accordance with this act are generally known as the "land-grant" colleges. It may well be said that this was the most far-reaching and statesmanlike stroke of educational policy that any government has ever initiated.

On February 3, 1863, Governor Carney signed a joint resolution passed by the Kansas legislature, in accordance with which the pro-

visions of the Morrill Act "are hereby accepted by the State of Kansas; and the State hereby agrees and obligates itself to comply with all the provisions of said act." On February 16 of the same year the governor signed an act which permanently located the College at Manhattan, and provided—

"That the location of the said college is upon this express condition, that the Bluemont Central College Association . . . shall . . . cede to the State of Kansas, in fee simple, the real estate, . . . together with all buildings and appurtenances thereunto belonging; and shall . . . transfer and deliver to said State the apparatus and library belonging to said Bluemont Central College Association."

The three commissioners appointed by the governor selected 82,313.52 acres of the 90,000 granted by Congress. The deficiency of 7686.48 acres—an amount selected and found to lie within a railroad grant—was not made up by Congress till 1907.

After the passage of the creative act, no subsequent legislation was enacted by the federal government with reference to the "land-grant" colleges until the second Morrill Act, for the further endowment of agricultural colleges, was passed. This bill received the signature of President Harrison on August 30, 1890. This act applied—

"A portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts established under the provisions of an act of Congress approved July second, eighteen hundred and sixty-two."

It provided—

"That there shall be and hereby is annually appropriated, out of any money in the treasury not otherwise appropriated, arising from the sales of public lands, to be paid as hereinafter provided, to each state and territory for the more complete endowment and maintenance of colleges for the benefit of agriculture and the mechanic arts now established or which may be hereafter established, in accordance with an act of Congress approved July 2, 1862, the sum of \$15,000 for the year ending June 30, 1890, and an annual increase of the amount of such appropriation thereafter for ten years by an additional sum of \$1000 over the preceding year, and the average amount to be paid thereafter to each state and territory shall be \$25,000, to be applied only to instruction in agriculture, the mechanic arts, the English language, and the various branches of mathematics, physical, natural and economic science, with special reference to the industries of life and to the facilities for such instruction."

The third and last act of Congress increasing the income of agricultural colleges is the Nelson amendment to the agricultural appropriation bill, which was approved March 4, 1907. In addition, however, to providing for an increase in the support of these institutions from federal funds, the law contains the very significant provision specially authorizing the agricultural colleges to use a portion of this federal appropriation for the special preparation of instructors for teaching agriculture and mechanic arts. The essential features of the Nelson amendment are embodied in the following quotation from the bill:

"That there shall be and hereby is annually appropriated out of any money in the treasury not otherwise appropriated, to be paid as hereinafter provided, to each state and territory for the more complete endowment and maintenance of agricultural colleges now established, or

which may hereafter be established, in accordance with the act of Congress approved July 2, 1862, and the act of Congress approved August 30, 1890, the sum of \$5000, in addition to the sums named in the said act, for the fiscal year ending June 30, 1908, and an annual increase of the amount of such appropriation thereafter for four years by an additional sum of \$5000 over the preceding year, and the annual sum to be paid thereafter to each state and territory shall be \$50,000, to be applied only for the purposes of the agricultural colleges as defined and limited in the act of Congress approved July 2, 1862, and the act of Congress approved August 30, 1890; provided, that said colleges may use a portion of this money for providing courses for the special preparation of instructors for teaching the elements for agriculture and the mechanic arts."

The Development of the Kansas Agricultural College

The President and Faculty of the Bluemont Central College became the first board of instruction of the Kansas State Agricultural College, when the former institution was transferred to the State and assumed its present name. The Bluemont Central College was a small institution of the older American classical type, the curriculum resting upon Greek, Latin, and mathematics as the chief of fundamentals. Its transfer to the State, and its conversion into the State Agricultural College, involved at the time merely a change in name. The President and Faculty, and the curriculum remained unchanged. The second catalogue, that of 1864-'65, mentions an "agricultural" course, comprising one preparatory and two collegiate years; but, although this course was strengthened from time to time, the classical studies nevertheless remained until the year 1873, when the character of the institution was radically changed. Intensely practical courses replaced the then existing ones. The new scheme of instruction involved the abolition of the classical course, and the introduction of a practical scheme of industrial education, which comprised a farmer's course of six years, a mechanic's course covering four years, and a woman's course requiring six years. Strong opposition to the new educational policies was encountered, but the authorities of the institution adhered to them unswervingly, until the complete success of the new method silenced criticism. Thus the institution became in fact what it had hitherto been only in name—an agricultural college. In 1879 the Faculty consisted of the President, five professors, and six instructors of lesser rank, with a student body of 207. During this period of development the College was removed from the original Bluemont College site to its present campus, two miles nearer Manhattan.

From 1879 to 1897 no great changes were made in the courses of study, but the work was systematized and strengthened in many directions, retaining, however, the distinctive stamp of a college related to the industries. In 1897 the student enrollment was 734. The Faculty had grown in numbers, and the activities of the institution along investigative lines had been well begun through the organization of the Agricultural Experiment Station. Beginning with 1897, greater stress was laid upon the study of financial, economic, and social problems. Several men of considerable note were added to the Faculty for the purpose

of strengthening these phases of educational work. In 1897 four professional courses, each four years in length, were organized—in agriculture, in mechanical engineering, in domestic science, and in general science. These years, therefore, mark the beginning of an era of broadening and diversification of the lines of instruction.

In 1899 the administration of the institution changed, and during the years that have followed the institution has experienced an era of solid, substantial, and uninterrupted growth, gaining steadily in recognition and in influence over the State.

In 1916-'17 the number of heads of departments and full professors was forty-six, while the entire Board of Instruction and employees numbered 338. The student enrollment for the year 1916-'17, but not including the spring term, was 3279. In the fifteen-year period 1899-1914 additional buildings to the value of about \$500,000 were erected on the campus.

The history of the Kansas State Agricultural College may well be divided into five epochs. The first ten years, from 1863 to 1873, may be called the classical period of the College. The succeeding period, from 1873 to 1879, was the formative stage, the years of the foundation of the Agricultural College properly so called, and bore the stamp of a spirit of pure industrialism of the most intensely "practical" type.

The next eighteen years, from 1879 to 1898, may be called the scientific culture period—a period in which, under modified ideals, the institution was sought to be used not so much as a tool to teach young men and women how to make a living as to teach them *how to live*, and strove to accomplish the end of character building by means of scientific and technical training having especial reference to agriculture.

Expansion of courses, with consequent increased flexibility, plasticity, and adaptability of the means of instruction to the various ends of industrial life, marked the following epoch of twelve years. In this period we see a rising tendency toward an increased acknowledgment of the Agricultural College as the guardian and custodian of the State's industrial interests, and a steady growth of settled confidence over the State in its ability to solve the State's industrial problems.

The present time, therefore, finds the College and its inseparable coadjutor, the Experiment Station, occupying a position of far-reaching power and influence in connection with the most vital interests of the State of Kansas.

The Agricultural College accomplishes the objects of its endowment in several ways. It offers a substantial training in mathematics, in the fundamental sciences, in language, in history and civics, and in such other branches of human knowledge as experience has shown to be best adapted to give mental discipline, to develop good citizenship, and to furnish a proper equipment for entering upon active life. The combination of industrial training with the usual class and laboratory work has a special educational value. By the training of the hands the student is made more efficient in every way, is brought into contact with practical things, and is educated toward, rather than away from, an interest in industry and manual exertion. The general training which the College

offers aims, therefore, at an equally efficient development of the physical and the mental powers. The greatest immediate aid to improvement in social well-being and to betterment of the conditions of life is a thorough knowledge of science as applied to daily existence. In chemistry and physics, in geology, in botany, in bacteriology, in entomology, in mechanics, the student is brought to an understanding of the relation of man to the world around him, and to a knowledge of how to utilize natural forces for the protection and improvement of his own life.

The College trains directly toward the productive occupations in a considerable number of specialized branches. For example: In agriculture, the student may specialize in agronomy, horticulture, forestry, animal husbandry, dairying, poultry husbandry, or veterinary science. In engineering, the student may take work in mechanical, electrical, or civil engineering, architecture, or printing. For the young women, training in domestic science, domestic art, home furnishing, home decoration, etc., is offered.

A second large object of the College, made effective through the Agricultural Experiment Station, is to investigate the problems of agriculture in the widest sense. By conducting the researches of the Experiment Station in close connection with the educational work of the College, opportunity is afforded students to gain an understanding and an appreciation of the work of scientific investigation, and to become better able to appreciate the relation of science to agriculture. Opportunity is thus also offered to obtain such training as will fit competent students to become investigators, and to enter fields of agricultural leadership in the experiment stations, in the United States Department of Agriculture, as heads of private agricultural enterprises, or in the capacity of superintendents and managers of such undertakings.

In addition to the regular educational work, the College now maintains, through the Division of College Extension, a highly organized system of agricultural education among the farmers themselves. A corps of trained and efficient institute lecturers hold meetings in every county in the State, conduct seed trains, dairy trains, corn trains, alfalfa trains, and poultry trains, and publish two series of pamphlets of information and instruction—one for rural teachers, the other for members of farmers' institutes. In addition to the regular staff of the Division of College Extension, many members of the College Board of Instruction, and of the staff of the Experiment Station, give several weeks of each year to the public work of the farmers' institutes.

Finally, the College and the Station together are being increasingly charged by the State government with State industrial and police duties, such as pure food investigations, control of feeding stuffs and fertilizers, State forestry work, and other similar duties.

The Experiment Stations

The Agricultural Experiment Station

The Kansas Agricultural Experiment Station was organized under the provisions of an act of Congress, approved March 2, 1887, which is commonly known as the "Hatch Act," and is officially designated as—

"An act to establish agricultural experiment stations in connection with the colleges established in the several states under the provisions of an act approved July 2, 1862, and the acts supplementary thereto."

The wide scope and far-reaching purposes of this act are best comprehended by an extract from the body of the measure itself, in which the objects of its enactment are stated as being—

"To aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and practice of agricultural science."

The law specifies in detail—

"That it shall be the object and duty of said experiment stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and waters; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses for forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable."

On the day after the Hatch Act had received the signature of the President, the legislature of Kansas, being then in session, passed a resolution, dated March 3, 1887, accepting the conditions of the measure, and vesting the responsibility for carrying out its provisions in the Board of Regents of the Kansas State Agricultural College.

Until 1908 the expenses of the Experimental Station were provided for entirely by the federal government. The original creative act (the Hatch Act) carried an annual congressional appropriation of \$15,000. No further addition to this amount was made until the passage of the Adams Act, which was approved by the President March 16, 1906. This measure provided, "for the more complete endowment and maintenance of agricultural experiment stations," a sum beginning with \$5000, and increasing each year by \$2000 over the preceding year for five years, after which time the annual appropriation was to be \$15,000—

"To be applied to paying the necessary expenses of conducting original researches or experiments bearing directly on the agricultural industry of the United States, having due regard to the varying conditions and needs of the respective states or territories."

It is further provided that—

"No portion of said moneys exceeding five per centum of each annual appropriation shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation or repair of any building or buildings, or to the purchase or rental of land."

The Adams Act, providing as it does for original investigations, supplied the greatest need of the Experiment Station—the means of providing men and equipment for advanced research. Only such experiments may be entered upon, under the provisions of this act, as have first been passed upon and approved by the Office of Experiment Stations of the United States Department of Agriculture.

In the neighborhood of fifty projects, covering practically all phases of agricultural investigation, are being studied by the members of the Experiment Station staff.

The farms, livestock, laboratories, and general equipment of the College are all directly available for the use of the Experiment Station.

In 1915 the legislature of Kansas appropriated the sum of \$80,000 for the support of the Experiment Station for the biennium 1915-1917. The income of the Experiment Station for the year 1916-1917, is, therefore, derived as follows:

Hatch fund (federal).....	\$15,000
Adams fund (federal).....	15,000
State appropriation (general)	40,000
State appropriation (special):	
Coöperative seed experiments.....	7,500
Total.....	\$77,500

The results of the work of the Experiment Station are published in the form of bulletins, circulars, and scientific papers other than bulletins and circulars. These bulletins are of two classes, those which record the results of research work of a purely scientific character and those which present technical information in a simplified form, suitable for the general reader. The circulars are brief and condensed popular presentations of data which call for immediate application, as well as timely and useful information not necessarily new or original. The scientific papers are usually published as reprints of addresses given before scientific bodies. These reprints contain original information or report definite steps in the progress of investigations under way.

All bulletins and other publications from the Experiment Station are sent without charge to citizens of the State. Any person in the State who so desires may have his name placed on the permanent mailing list of the Station.

Letters of inquiry and general correspondence should be addressed: "Agricultural Experiment Station, Manhattan, Kan." Special inquiries should be directed, so far as possible, to the heads of departments having in charge the matters concerning which information is desired.

PUBLIC WORK OF THE STATION

In addition to the work of agricultural investigation and research, the State has enlarged the activities of the Station along various lines of the State executive or control work.

One of the most important of these adjunct offices is that of State Dairy Commissioner, for which an appropriation of \$7500 a year was made for 1918 and 1919. This official, appointed by the Board of Administration, and having his office at the seat of the Agricultural College, is required (Laws of 1909, ch. 237)—

"To inspect or cause to be inspected all the creameries, public dairies, butter, cheese and ice-cream factories, or any place where milk or cream or their products are handled or stored within the State, at least once a year, or oftener if possible."

He may in connection with the Board of Administration of the College—

"Formulate and prescribe such reasonable rules and regulations for the operation of creameries, butter, cheese and ice-cream factories and public dairies as shall be deemed necessary by such board to fully carry out the provisions of this act."

He may act on complaints regarding the sale of unwholesome or unclean dairy products, and may prohibit their sale. He may—

"Condemn for food purposes all unclean or unwholesome milk, cream, butter, cheese or ice-cream, wherever he may find them."

Another important State function is that of the State Entomological Commission. (Laws of 1907, ch. 386; 1909, ch. 27.) This commission, created in 1907, was established—

"To suppress and eradicate San José scale and other dangerous insect pests and plant diseases throughout the State of Kansas."

The professors of entomology at the Agricultural College and at the University of Kansas are by law designated as two of the five members of the above commission. Acting under the title of State entomologists, they divide between them the territory of the State, for the purposes of inspection.

They are empowered—

"To enter upon any public premises . . . or upon any land of any firm, corporation or private individual within the State of Kansas, for the purpose of inspection, destroying, treating or experiment upon the insects or diseases aforesaid."

They may treat or cause to be treated "any and all suspicious trees, vines, shrubs, plants, and grains," or, under certain conditions, may destroy them. They must annually inspect all nursery stock, and no nursery stock is to be admitted within the State without such inspection. For the expenses of the work of the commission, \$3000 was appropriated in 1917 for each of the following two years.

Concerned with the livestock interests of the State is the State Live Stock Registry Board, with regard to which there is the following provision (Laws of 1913):

"Every person, persons, firm, corporation, company or association that shall stand, travel, advertise or offer for public service in any manner any stallion in the State of Kansas, shall secure a license certificate for such stallion from the Kansas State Live Stock Registry Board, as herein provided. Said board shall consist of the dean of the Division of Agriculture, head of the Animal Husbandry Department, and the head of the Veterinary Department of the Kansas State Agricultural College."

To this board is assigned the duty of licensing stallions used for breeding purposes within the State, and authority to verify their breeding and to classify them under the following heads: pure-bred, grade, cross-bred, and scrub. No animal not thus approved and licensed with the board is permitted to be used for public breeding purposes.

The suppression of tuberculosis in cattle is also delegated by the State to the Agricultural College. (Laws of 1909, ch. 160.)

By legislature act (Laws of 1909, ch. 49), a "division of forestry" at the Agricultural College is also provided for in the following terms:

"For the promotion of forestry in Kansas there shall be established at the Kansas State Agricultural College, under the direction of the Board of Regents, a division of forestry. The Board of Regents of the Kansas State Agricultural College shall appoint a State forester, who shall have general supervision of all experimental and demonstration work in forestry conducted by the Experiment Station. He shall promote practical forestry in every possible way, compile and disseminate information relative to forestry, and publish the results of such work through bulletins, press notices, and in such other ways as may be most practicable to reach the public, and by lecturing before farmers' institutes, associations, and other organizations interested in forestry."

The State has also placed the Experiment Station in charge of the execution of the acts concerning the manufacture and sale of livestock remedies and commercial feeding-stuffs (Laws of 1913), and also of commercial fertilizers (Laws of 1907, chapter 217). It is provided by the statutes that every brand of livestock remedy and every brand of commercial feeding-stuff offered or held for sale or sold within the State of Kansas shall be registered in the office of the Director of the Agricultural Experiment Station of the Kansas State Agricultural College, and each sale of any such brand not so registered shall constitute a separate violation of this act.

And—

"Except as herein provided, it shall be unlawful within the State of Kansas to sell, offer for sale, or expose for sale any commercial fertilizer which has not been officially registered by the Director of the Agricultural Experiment Station of the Kansas State Agricultural College."

These general provisions are limited in their application by important exceptions stated in the laws. The fees collected under these acts are used to defray the necessary expenses incurred in carrying out the provisions of the act.

It will thus be seen that the State of Kansas is making increasing use of the scientific staff of the Experiment Station in matters of State importance requiring the application of technical knowledge.

The great economic importance of the wheat and milling interests of this State, and the difficult nature of the problems connected with the milling and baking quality of wheat, render it imperative that scientific research be conducted on the subject. The hearty coöperation and financial support of all the millers' associations and of other commercial bodies rendered it financially possible to inaugurate this important experimental work until special legislative appropriation could be secured. The legislature of 1913 appropriated \$7500 for mill equipment, and there is now installed the best-equipped experimental milling plant in the United States. The department has a seventy-five-barrel model mill and a specially equipped laboratory for carrying on experimental baking tests and for making certain chemical determinations.

The research work includes a complete study of the growing, harvesting, storing and marketing practices and their relation to the milling value of wheat; of systems of grading, and their effect upon the market value of grain; of insect enemies of wheat in the field and in storage; and of flour and mill by-products. There will also be conducted a comprehensive study of the effects of climate and soil upon the chemical composition of wheat, and upon its subsequent milling and baking quality.

By the act of the legislature (Laws of 1911, ch. 23, p. 46) the Board of Administration is authorized—

“To investigate the present methods used in growing and distributing agricultural seeds in the State; to determine by experiments the methods of growing seed best adapted to different localities; to encourage farmers in the use of the best methods of seed production; to determine by investigation those localities most in need of improved seed, and to aid such localities in securing desirable seed.”

For carrying out the provisions of this act, the sum of \$7500 is appropriated each year.

Branch Agricultural Experiment Stations

FORT HAYS BRANCH STATION

The land occupied by this Station is a part of what was originally the Fort Hays military reservation. Being no longer required for military purposes, it was turned over to the Department of the Interior October 22, 1899, for disposal under the act of Congress of July 5, 1884. Before final disposition of this land was made, however, the Kansas legislature, in February, 1895, passed a resolution requesting the Congress of the United States to donate the entire reservation of 7200 acres to the State of Kansas for the purposes of agricultural education and research, for the training of teachers, and for the establishment of a public park. Bills giving effect to this request were introduced into Congress without avail, until the fifty-sixth Congress, when, through the influence of Senator, later Regent, W. A. Harris, and of Congressman Reeder, a bill was passed, setting aside this reservation “for the purpose of establishing an experimental station of the Kansas Agricultural College and a western branch of the Kansas State Normal School thereon and a public park.” This bill was approved by the President

on March 28, 1900. By act of the State legislature approved on February 7, 1901, the act of Congress donating this land and imposing the burden of the support of these institutions was accepted. The same session of the legislature passed an act providing for the organization of a branch experiment station and appropriating a small fund for preliminary work.

The land at the Fort Hays Branch Station consists mainly of high rolling prairie, with a limited area of rich alluvium bordering on a creek, and is situated on the edge of the semi-arid plains region. It is well suited for experimental and demonstration work in dry farming, in irrigation, and in crop, forestry, and orchard tests, under conditions of limited rainfall and high evaporation.

The work of this station may be divided into two divisions: (A) experimental projects, (B) general farm and livestock work. The experimental projects are as follows: Dry farming investigations, forage crops investigations, cereal crop investigations, forest, nursery and park demonstrations and investigations, farm dairying, and feeding and breeding livestock experiments. All this work is confined to the study of the problems peculiar to the western half of the State, and relates especially to crop production under limited rainfall, to the origination of varieties better adapted to the climatic conditions there prevailing, and to studies of the systems of animal husbandry and dairy husbandry suited to this region. A systematic study of the value of trees as preventives of soil drifting is being made on a scale sufficiently large to bring definite conclusions. The facilities of this Station are being used for the growing of large quantities of pure seed of the strains and varieties which have proved in actual test to be most productive in the western part of the State.

This Station is supported entirely by State funds and by the sale of farm products. Under the terms of the acts of Congress establishing and supporting agricultural experiment stations, and under the rulings of the United States Department of Agriculture, none of the funds appropriated by the federal government may be used for the support of branch experiment stations.

The State appropriation for the maintenance of the Fort Hays Branch Experiment Station is \$10,000 for 1918 and \$10,000 for 1919.

GARDEN CITY BRANCH STATION

In 1906 the county commissioners of Finney county purchased, for purposes of agricultural experimentation, a tract of land amounting to 320 acres, situated four and one-half miles from Garden City, on the unirrigated upland.

The land has been leased for a term of ninety-nine years to the Kansas Agricultural Experiment Station as an "experimental and demonstration farm," for the purpose of determining the methods of culture, crop varieties, and crop rotations best suited to the southwestern portion of the State, under dry-land farming conditions. A pumping plant irrigating from eighty to one hundred acres has been installed for the purpose of investigating the expenses of pumping and the cost of equipment

necessary for plants of this type, which are common in the shallow-water districts between Garden City and Scott City and along the Arkansas valley. The "duty of water" and the method of applying water are objects of investigation. For improvements and maintenance of this Station the sum of \$5000 was appropriated for the year 1917-'18 and \$5000 for the year 1918-'19.

COLBY BRANCH STATION

The legislature of 1913 provided for the establishment of a branch experiment and demonstration station near Colby, in northwestern Kansas, "for the purpose of advancing and developing the agricultural, horticultural and irrigation interests of this State and western Kansas." Fifteen thousand dollars was appropriated for the establishment and maintenance of the Colby Station for the biennium 1913-'15. The Station was located upon a tract of three hundred and sixteen acres of land bordering upon the town site of Colby. This land was purchased by the county and deeded to the State for the purposes named above. Operations were begun in March, 1914. Cropping experiments are being conducted under dry-land conditions and under irrigation. Water is being lifted one hundred and fifty feet for irrigating a garden, fruit trees, and a few desirable crops, such as alfalfa, that could not be grown successfully in western Kansas with the natural rainfall. The primary purpose of the Colby Station is to determine the best methods of developing the agriculture of northwestern Kansas and to make it a still more desirable place to live.

The 1915 legislature appropriated for the erection of a dairy barn and silos, for the purchase of a dairy herd, and for the maintenance of the Colby Station, \$4000 for 1915-'16 and \$3000 for 1916-'17.

The 1917 legislature appropriated \$2500 for 1917-'18 and \$2500 for 1918-'19 for the maintenance and experimental work of this Station.

TRIBUNE BRANCH STATION

At the Tribune Station experimental and demonstration work is conducted for the benefit of the surrounding territory. The legislature of 1917 appropriated \$2000 for the maintenance of this station for the year 1917-'18 and \$2000 for 1918-'19.

DODGE CITY BRANCH STATION

The State Forestry Station at Dodge City was reorganized as a branch experiment station in 1909, on 160 acres of land, leased from Ford county. This Station was maintained as a dairy demonstration farm until July 1, 1917. Upon the equipment having been transferred to the Garden City Station by order of the Board of Administration, the lease was returned to Ford county.

The Engineering Experiment Station

The Engineering Experiment Station was established for the purpose of carrying on tests and research work of engineering and manufacturing value to the State of Kansas, and of collecting, preparing, and presenting technical information in a form readily available for the use of the various industries within the State. It is the intention to make all the work of the Experiment Station of direct importance to Kansas.

All of the equipment of the various engineering and scientific laboratories and shops and of the College power plant are available for this work, while the personnel of the Station staff is made up of professors and instructors from the various departments of the Division of Engineering and from other scientific departments whose work is directly related to the work of this division.

Among the tests now being carried on are investigations of the effect of freezing, before it has hardened, on the strength of concrete, the macadam-making properties of various Kansas stones, the relative costs of concrete of a given quality when made with and without coarse aggregates, the relative economy of gasoline and cheaper fuels in internal-combustion engines, the effect of compression on the explosive pressures of various gas-engine fuel mixtures, the comparative advantage of steam and oil traction engines, the use of bituminous coals in gas producers, power-plant economics, the use of gasoline-electric generating sets for isolated plants, as on the farm, the use of the windmill for driving electric generators for farm lighting, the losses in electric transmission lines, and in town and city distribution systems, the mechanical and electrical properties of commercial copper wire used in pole-line construction, the economy of electric cooking and heating devices, and the effect of chemical composition on the durability and protective power of paints.

Various other investigations are being carried on upon brick, concrete, fuels, pipe coverings, belt lacings, glued joints, blacksmith coals, foundry sands, centrifugal pumps, farm water supply, sewage disposal, and problems in farm architecture.

The results of the investigations are published as bulletins and circulars of the Engineering Experiment Station, which are sent free to any citizen of the State upon request. Besides issuing these bulletins, the Station answers yearly many hundreds of requests for information upon matters coming within its field.

Requests for bulletins and general correspondence should be addressed to Engineering Experiment Station, Manhattan, Kan. Requests for information in specific matters should be addressed, so far as it is possible, to the heads of departments in whose fields the particular matters lie.

Grounds, Buildings, and Equipment

The College campus occupies a commanding and attractive site upon an elevation adjoining the western limits of the city of Manhattan, with electric-car service into town and to the railway stations. The grounds are tastefully laid out according to the designs of a landscape architect, and are extensively planted with a great variety of beautiful and interesting trees, arranged in picturesque groups, masses, and border plantings, varied by banks of shrubbery and interspersed with extensive lawns, gardens, and experimental fields. Broad, well-shaded macadamized avenues lead to all parts of the grounds. Cement walks connect the buildings with one another and with the entrances. Including the campus of 160 acres, the College owns 748 acres of land at Manhattan, valued at \$185,000, and rents 522 acres in addition. Outside the campus proper, all of the land is devoted to educational and experimental work in agriculture. Within the College grounds, most of the space not occupied by buildings and needed for drives and ornamental plantings is devoted to orchards, forest and fruit nurseries, vineyards, and gardens. A number of fields in the northern and western portions of the campus are used for general experimental work by various departments.

The College buildings, twenty-one in number, are harmoniously grouped, and are uniformly constructed of limestone obtained from the College quarries. A central power plant furnishes steam heat and electric light and power to the buildings, and a plant for the manufacture of producer gas supplies some of the laboratories and shops. The College owns and operates its own system of waterworks and is provided with a complete sewerage system.

AGRICULTURAL HALL (NEW). Erected 1912; cost of portions now completed, \$125,000; cost of building when developed and completed as planned, \$500,000. The completed building will consist of a central portion (130 x 80 feet), with basement and three stories; of two wings (each 80 x 169 feet), with basement and three stories, and with a sub-basement under half of the east wing; and of a stock-judging pavilion placed back of the central portion and between the wings. This pavilion is now completed, and contains tie and box stalls and two large stock-judging rooms (45 x 100 feet), each having a seating capacity of 475. Each of these rooms may be divided into two, with a passage between, by the use of curtains. The east wing of the building is used by the Departments of Agronomy, Animal Husbandry, Milling Industry, and Poultry Husbandry. This wing contains, besides offices and recitation rooms of these departments and the general offices of the Agricultural Experiment Station, a complete small flour mill, and laboratories for grain judging. Value of equipment: *Agronomy, \$15,500; Animal Husbandry, \$5920; Dean's Offices, \$1702; Executive Department, \$775; Experiment Station, \$1507; Milling Industry, \$16,951; Poultry Husbandry, \$800.

* The figures for equipment are taken from the reports of June 30, 1916.

ANDERSON HALL. Erected, 1879; cost, \$79,000; dimensions, 152 x 250 feet; two stories and basement. Contains the offices of administration of the College, a lecture hall, the College post office, offices of the Division of College Extension and of the Department of Student Health, and offices and classrooms of the Departments of Architecture and Drawing, Economics, Education, English Language, English Literature, and Mathematics. Value of equipment, \$16,401.

AUDITORIUM. Erected, 1904; cost, \$40,000; dimensions, 113 x 125 feet. Has a large stage with drop curtain and scenery. Seating capacity, 2300. Contains also the offices and music rooms of the Department of Music. Value of equipment, \$3803.

CHEMISTRY ANNEX. Erected, 1876; cost, \$8000; dimensions, 35 x 110 and 46 x 175 feet, in the form of a cross. Originally erected as a chemical laboratory. Reconstructed at a cost of \$5000 after a fire in 1900, the building was used from 1902 to 1911 as a women's gymnasium; since 1911, used by the Department of Chemistry. Value of equipment, \$9188.

DAIRY BARN. Erected, 1900; cost, \$4000; dimensions, 40 x 175 feet. Fitted with modern swinging stalls for eighty head of cows, and arranged in two rows with driveway between. Value of equipment, \$1800.

DAIRY HALL. Erected, 1904; cost, \$15,000; dimensions, 72 x 103 feet; one story and basement. Contains butter-manufacturing rooms, hand-separator room, laboratory, classroom, three offices, and two refrigerating rooms. Occupied entirely by the Department of Dairy Husbandry. Value of equipment, \$14,869.

DENISON HALL. Erected, 1902; cost, \$70,000; dimensions, 96 x 166 feet; two stories and basement. The east wing is occupied throughout by the laboratories, classrooms and offices of the Department of Chemistry. The west wing is occupied by the Department of Electrical Engineering and by the Department of Physics. Value of equipment: Chemistry, \$39,350; Electrical Engineering, \$23,876; Executive, \$500; Physics, \$10,979.

DOMESTIC SCIENCE AND ART HALL. Erected, 1908; cost, \$70,000; dimensions, 92 x 175 feet; two stories and basement. The first floor and basement are occupied by the laboratories, classrooms, and offices of the Department of Domestic Science; the second floor is occupied by the laboratories, classrooms, and offices of the Department of Domestic Art. Value of equipment: Domestic Science, \$15,109; Domestic Art, \$6118; Executive, \$205.

ENGINEERING SHOPS. These consist of several connected structures, erected at different times. The original building, now used as the wood-working shop, was erected in 1876; a series of additions having later been successively made, the present group is the result. The cost of the whole amounts to \$35,000. A portion of the building is two stories high. On the upper floor, which has a floor area of 9260 square feet, are classrooms, drafting rooms, pattern storage room, and offices of the Department of Steam and Gas Engineering, Applied Mechanics and Machine Design, and Shop Practice. The woodworking shop (35 x 219 feet) is

equipped with the necessary bench tools and woodworking machinery. Adjoining is the machine shop (40 x 170 feet), supplied with benches and tools and amply equipped with the necessary machine tools. The blacksmith shop (50 x 100 feet) contains 35 forges of modern type, connected with power blast and down-draft exhaust. Adjoining is the lecture hall, with demonstration forge and equipment. The iron foundry (27 x 100 feet) and brass foundry (24 x 34 feet) are well supplied with the necessary equipments. The wash and locker room (36 x 40 feet) contains 250 steel lockers. A general supply room (22 x 24 feet) is conveniently located for storing the necessary small supplies. Value of equipment, \$40,496.

FAIRCHILD HALL. Erected, 1894; cost, \$67,750; dimensions, 100 x 140 feet; two stories, basement, and attic. On the first floor are the College library and reading rooms, a newspaper reading room, offices of the librarian and his assistants, and the general museum. On the second floor are the offices, classrooms and laboratories of the Departments of Zoölogy, Entomology, and Geology, and of History and Civics. The museums of natural history are placed here also. The basement is occupied largely by recitation rooms and offices of the Department of History and Civics and the Department of Public Speaking. Value of equipment: Entomology, \$14,440; Zoölogy, \$23,200; Executive, \$323; History and Civics, \$657; Library, \$124,437.

FARM BARN. Erected, 1913; cost, \$17,000; a stone structure, dimensions, 80 x 160 feet. The west wing contains nine box stalls and twenty-six single stalls, equipped with sanitary feed mangers and racks and designed especially for the housing of horses. The east wing contains twelve box stalls and thirty single stalls for the breeding cattle and show herd. Center section, office and carriage rooms, with basement for heating apparatus.

FARM MACHINERY HALL. Erected, 1870; cost, \$11,250; dimensions, 46 x 95 feet; two stories. The first building erected on the present campus. Originally designed as a College barn, and first used for that purpose. Later used as a general College building, then by the Department of Botany, and afterwards by the Department of Veterinary Medicine. The first floor, a large hall, was used by the Department of Military Science for many years as an armory. The entire building has been given over for the use of the Department of Farm Machinery, and is filled with all types of farm machinery. Value of equipment, \$7156.

HORTICULTURAL BARN. Erected, 1889; cost, \$1000. Contains store-room, granary, and stable room for several horses.

HORTICULTURAL HALL. Erected, 1907; cost, \$50,000; dimensions, 72 x 116 feet. This building, one of the best and most commodious on the campus, is now used by the Departments of Botany, Horticulture, and Forestry. Its classrooms, laboratories, museums, and equipment are modern and ample. Value of equipment: Botany, \$20,096; Executive, \$272; Forestry, \$4351; Horticulture, \$12,621.

HORTICULTURAL LABORATORY. Erected, 1888; cost, \$5000; dimensions, 30 x 30 feet; one story and basement. Used for many years by the Department of Horticulture and Entomology, then for horticultural work when that was made a separate department. Contains offices occupied by the State Dairy Commissioner. Value of equipment, \$1090.

KEDZIE HALL. Erected, 1897; cost, \$16,000; dimensions, 70 x 84 feet; two stories and basement. Used from its erection till 1908 by the Departments of Domestic Science and Domestic Art. Basement occupied by the printing plant; first floor taken up by the cafeteria since the summer of 1915, and by offices of the Department of the English Language; second floor divided into general classrooms and offices used by the Departments of Industrial Journalism and Printing, and English. Value of equipment: Cafeteria, \$3399; English, \$500; Executive, \$156; Industrial Journalism and Printing, \$6226.

MECHANICAL ENGINEERING HALL. Erected, 1909; cost, \$80,000; dimensions, 113 x 200 feet; three stories in height, but much of it built on the gallery plan rather than by complete floor separation into different stories. This building contains the general offices of the Division of Mechanic Arts, the offices and drafting rooms of the Departments of Civil Engineering, Steam and Gas Engineering, and Architecture, a reading room, an amphitheater for lectures and demonstrations, and the experimental laboratories for applied mechanics, hydraulics, road materials, steam and gas engineering. The engines, turbines, generators, and boilers that furnish power and light for the College are installed in this building. Value of equipment, \$99,786.

NICHOLS GYMNASIUM. Erected, 1911; cost, \$122,000; dimensions 102 x 221 feet; three stories and basement. The building consists of a main section and two wings. The main section (85 x 141 feet), consisting of two stories and a basement, is used as a men's gymnasium and armory, and contains a running track, sixteen laps to the mile. The east half of the basement of the main section contains a swimming pool, baths, rest room, etc., for women; the west half contains a swimming pool and baths for men. The east wing (40 x 102 feet) contains the women's gymnasium, classrooms and offices of the Department of Military Training, and several literary society halls. The west wing (40 x 102 feet) contains the offices of the Directors of Athletics and Physical Education, a large locker room for men, classrooms and offices of the Department of German, and several literary society halls. This building is constructed on the old armory-castle type and is modern in every respect. Value of equipment, \$5674.

REPAIR SHOP. Erected 1877; cost, \$4000; dimensions, 32 x 80 feet; one story and basement. At an early period used as a horticultural hall; now the headquarters for general College repairs. Value of equipment, \$4025.

SCHOOL OF AGRICULTURE HALL. Erected, 1900; cost, \$25,000; dimensions, 90 x 95 feet; two stories and basement. Occupies the original site

of the President's house, destroyed by lightning in 1896. Contains classrooms and offices of the School of Agriculture. Value of equipment, \$1682.

VETERINARY HALL. Erected, 1908; cost, \$70,000; dimensions, 133 x 155 feet; two stories and basement. Occupied by the laboratories, demonstration and dissecting rooms, classrooms, and offices of the Department of Veterinary Medicine and Bacteriology. Value of equipment and apparatus: Veterinary Medicine, \$16,946; Bacteriology, \$12,287; Executive, \$243.

In addition to the substantial stone buildings mentioned above the College has a number of other buildings, among them the following:

SERUM BARN. Erected, 1914; cost, \$3000; dimensions, 92 x 96 feet; contains thirty pens, each 8 x 12 feet, and two feed rooms of the same dimensions. This is a frame and cement building situated three-quarters of a mile north of the College campus.

SERUM BUILDING. Erected, 1914; cost, \$7000; constructed of brick; dimensions, 24 x 60 feet; two stories.

In addition to the equipment listed in the preceding paragraphs, several other important items might well be mentioned, *e. g.*, livestock, valued at \$71,281, and the water tower, heat tunnels, etc., valued at \$72,723.

Library

The general College Library consists of all books belonging to the College, including the library of the Experiment Station, which is incorporated with it. On January 1, 1917, the Library contained 55,790 bound volumes, besides much unbound material. It receives currently about four hundred serial publications. As a depository the Library receives the documents and other publications of the United States government. The books are classified according to the Dewey system and are indexed in a dictionary card catalogue.

All students, as well as all officers of administration and instruction, have the privilege of direct access to the book stacks. The Library is primarily for free reference use, but the privilege of drawing books is accorded to all those connected with the College as registered students or as members of the Faculty. Books not specially reserved may be drawn for home use for two weeks. All books are subject to recall at any time.

General reference books, books reserved for classes, general periodicals, and certain other groups of books are to be consulted only in the reading rooms. They may not be loaned from the Library except when the reading rooms are closed. They must then be returned to the Library by the time it next reopens. Any violation of the regulations of the Library subjects the offender to a fine, or to a withdrawal of library privileges, or to both, according to the gravity of the offense. More serious offenses, such as mutilation or theft of books or periodicals, are considered just causes for suspension or expulsion of the offender, who is also required to make good the loss incurred.

Reading Rooms.—Three reading rooms are maintained in connection with the Library: the general reference room, containing encyclopedias, dictionaries, atlases, bibliographies, and general reference books; the special reference room, containing books reserved for classes; and the periodical room, containing current magazines and the important daily and weekly Kansas newspapers. These rooms are freely open to the students and to the public for purposes of reading and study.

Divisional Libraries.—Divisional and departmental collections are deposited in certain College buildings apart from the main Library. These collections are for the special convenience of the instructors and students of the departments concerned. They are under the direction of the Librarian and are accessible to all students at regular hours.

Requirements for Admission

The entrance requirements to the College are made broad and flexible, only fundamental subjects being definitely required. These requirements are made upon the supposition that high schools are local institutions in which the courses should be adapted to the needs of the individual localities, and that college entrance requirements should be such as to take the output of the high schools, rather than to determine the nature of the work offered in them.

Persons to be admitted to any department of the College must be at least fourteen years of age. Fifteen units of high-school work are required for admission to the freshman class. A unit is defined to be the work done in an accredited high school or academy in five recitation periods a week for one school year. All persons who offer fifteen units of work done in an accredited high school, and accepted by such high school for graduation, will be admitted to the freshman class. One who offers fourteen such units will also be admitted as a freshman, but will be conditioned in one unit. Such deficiency must be made up the first year that the student is in attendance. If not made up within that time College credits are taken in its place.

REQUIRED ENTRANCE SUBJECTS

For courses in the divisions of agriculture, home economics, or general science the high-school work offered must include three units of English, two units of mathematics (algebra and geometry), and one unit of physics. For courses in the division of mechanic arts the high-school work offered must include, in addition to the preceding, another unit of mathematics, of which one-half unit must be algebra and one-half geometry. Students lacking any of these must make them up before graduation, and before being assigned to dependent subjects.

ACCEPTABLE ENTRANCE SUBJECTS

The subjects from which entrance credit may be offered, together with the number of units, are arranged in eight groups, as follows:

GROUP I	
English	Three or four units
GROUP II	
Foreign Languages	Latin, one, two, three, or four units
	Greek, one, two, three, or four units
	German, one, two, three, or four units
	French, one, two, three, or four units
GROUP III	Spanish, one, two, three, or four units
	Elementary algebra, one or one and one-half units
	Plane geometry, one unit
	Solid geometry, one-half unit
	Plane trigonometry, one-half unit
Mathematics	Advanced algebra, one-half unit

GROUP IV Natural Sciences	Physical geography, one-half or one unit
	*Physics, one unit
	*Chemistry, one unit
	*Botany, one-half or one unit
	*Zoölogy, one-half or one unit
	*Physiology, one-half or one unit
	*General biology, one-half or one unit
GROUP V History and Social Sciences	*General science, one-half or one unit
	Greek and Roman history, one unit
	Medieval and modern history, one unit
	English history, one unit
	American history, one unit
	Economics, one-half or one unit
	Sociology, one-half unit
GROUP VI Normal Train- ing Subjects	Civics, one-half unit
	Psychology, one-half unit
	Methods and management, one-half unit
	Higher arithmetic, one-half unit
	Reviews
	Grammar, twelve weeks
	Geography, twelve weeks
GROUP VII Industrial Subjects	Reading, twelve weeks
	*Music, one unit
	*Agriculture, one-half or one, two, three, or four units
	*Drawing, one-half or one unit
	*Woodwork, one-half, one or two units
	*Forging, one-half or one unit
	*Domestic science, one-half, one or two units
GROUP VIII Commercial Subjects	*Domestic art, one-half, one or two units
	Commercial law, one-half unit
	Commercial geography, one-half unit
	Bookkeeping, one-half or one unit
	*Stenography and typewriting, one-half or one unit

DEFICIENCIES

The courses in the School of Agriculture offered in connection with the College give every needed opportunity for students of the College to make up anything lacking in their preparation for entrance. All such entrance deficiencies must be made up before the beginning of the sophomore year. No student is registered in the senior class unless all deficiencies of the preceding years have been provided for. Candidates for graduation must make up all deficient subjects before the beginning of the spring term of the senior year. No student is considered a candidate for graduation the next spring who is deficient more than three full subjects in addition to his regular assignment at the beginning of the first semester. No student who fails or is conditioned or found deficient in any subject, or whose grade in more than one subject falls below G in any term, is allowed to carry extra work during the succeeding term.

* In courses consisting of laboratory work wholly or in part, two periods of laboratory work are to be considered the equivalent of one recitation period.

ADVANCED CREDIT

At the discretion of the President, students who present certificates showing credits for college work done in other institutions are allowed hour-for-hour credit on courses in this College in so far as they may be directly applied, or can be accepted as substitutions or electives. Candidates must present to the Committee on Advanced Standing their high-school and college credits certified to by the proper authorities. It is requested also that a college catalogue covering the period of attendance be furnished with the above credentials. In cases in which it is impossible for one to furnish an acceptable certificate concerning work upon which advanced credit is asked, examinations are given, if the subject has been studied under competent instruction.

ADMISSION

ADMISSION BY EXAMINATION. Examinations for admission will be held at the College on Monday, September 10, 1917; and Tuesday, January 29, 1918, for the second semester.

ADMISSION BY CERTIFICATE. The applicant is required to submit to the Committee on Admission a certificate of the high-school or academy credit properly certified to by the authorities of the institution in which the work was done. Blanks will be furnished by the College for this purpose. It is requested that all work done in such school or academy be presented upon these blanks, in order to expedite the granting of credit to such applicants as are entitled to it.

It is greatly to the advantage of the prospective student to see to it that this blank, properly filled out and indicating the course he wishes to take here, be sent to the College as soon as possible after graduation. A permit to register will then be sent him by the Registrar in advance of his coming in September. This will greatly facilitate the work of entrance. The student will present this permit at the registration room in Nichols Gymnasium, and will not be compelled to wait his turn to meet the Committee on Admission.

LATE REGISTRATION

A considerable amount of extra work and a great deal of confusion is caused by the neglect of students to enroll at the time set for that purpose, and a fee of \$1 will be charged those who enroll after the time fixed for the close of registration unless they present a good excuse for their delay.

SPECIAL STUDENTS

In recognition of the fact that experience and maturity tend to compensate, in a measure at least, for lack of scholastic attainment, the College admits as special students those who are twenty-one years of age or older, without requiring them to pass the regular examinations, provided (1) they show good reason for not taking a regular course; (2) they be assigned only to such work as they are qualified to carry successfully; (3) they do superior work in the subjects assigned.

A special student is assigned by the dean of the division in which occur the major subjects to be pursued.

KANSAS HIGH SCHOOLS AND ACADEMIES IN ACCREDITED
RELATIONS WITH THE COLLEGE

(Graduates admitted without examination)

Abilene	Clay Center	Goodland
Admire	(Clay County)	(Sherman County)
Agra	Clearwater	Great Bend
Alden	Clifton	Greenleaf
Alma	Clyde	Greeley
Almena	Codell	Greensburg
Altamont	Coffeyville	(Kiowa County)
(Labette County)	Colby	Grenola
Alta Vista	(Thomas County)	Grinnell
Alton	Coldwater	Gypsum
Altoona	Colony	Halstead
Americus	Columbus	Hamilton
Andover	(Cherokee County)	Hanover
Anthony	Concordia	Harper
Anthony	Conway Springs	Hartford
(Spring Township)	Corning	Harveyville
Antrim	Cottonwood Falls	Haven
Argonia	(Chase County)	Havensville
(Dixon Township)	Council Grove	Haviland
Arkansas City	Courtland	Hays
Arlington	Cuba	Hazelton
Ashland	Culver	Healy
Assaria	Cunningham	Herington
Atchison	Delia	Hiawatha
Atlanta	(Washington Township)	Highland
Attica	Delphos	Hill City
Atwood	Derby	Holington
(Rawlins County)	Dexter	Holton
Augusta	Dighton	Hope
Axtell	(Lane County)	Horton
Baldwin	Dodge City	Howard
Barnard	Douglas	Hoxie
Barnes	Downs	(Sheridan County)
Basehor	Easton	Hugoton
Bazine	Edna	Humboldt
Beattie	Edwardsville	Hutchinson
Belle Plaine	Effingham	Independence
Belleville	(Atchison County)	(Montgomery County)
Beloit	El Dorado	Ingalls
Belpre	Ellinwood	Iola
Benedict	Ellis	Irving
Beverly	Ellsworth	Isabell
Blue Rapids	Elsmore	Jamestown
Bonner Springs	Elwood	Jetmore
Bronson	Emporia	(Hodgeman County)
Brookville	Englewood	Jewell
Brownell	Enterprise	Junction City
Bucklin	Eskridge	Kansas City
Buffalo	Esbon	(Argentine)
Bunker Hill	Erie	(Central)
Burden	Eudora	(Sumner)
Burlingame	Eureka	Kensington
Burlington	Everest	Kincaid
Burns	Fairview	Kingman
Burr Oak	Florence	Kinsley
Burrton	Ford	Kiowa
Caldwell	Formoso	Kipp
Caney	Fort Scott	Kirwin
Canton	Fowler	La Crosse
Carbondale	Frankfort	La Cygne
Cawker City	Fredonia	La Harpe
Chanute	Frontenac	Lakin
Chapman	Fulton	Lansing
(Dickinson County)	Galena	Larned
Chase	Garden City	Latham
Cedar Vale	Garden Plain	Lawrence
Centralia	Gardner	Leavenworth
Cheney	Garnett	Lebanon
Cherokee	Geneseo	Lebo
(Crawford County)	Girard	Lecompton
Cherryvale	Goddard	Lenora
Chetopa	Glascø	Leon
Cimarron	Glen Elder	Leoti
Circleville	Goff	Le Roy
Claffin	Gove	Lewis

Liberal	Oketo	Sharon Springs
Lincoln	Olathe	Silver Lake
Lindsborg	Onaga	Smith Center
Linwood	Osage City	Soldier
Little River	Osawatomie	Solomon
Logan	Osborne	Spearville
Longton	Oskaloosa	Spivey
Lost Springs	Oswego	Spring Hill
Lucas	Ottawa	Stafford
Luray	Overbrook	Stark
Lyndon	Oxford	Sterling
Lyons	Ozawkie	Stockton
Macksville	Palco	Summerfield
McCracken	Paola	Sylvan Grove
McCune	Parsons	Sylvia
McLouth	Pawnee Rock	Syracuse
McPherson	Peabody	Tescott
Madison	Perry	Thayer
Maize	Phillipsburg	Tonganoxie
Manhattan	Pittsburg	Topeka
Mankato	Plainville	Toronto
Maple Hill	Pleasanton	Towanda
Marion	Plevna	Tribune
Marquette	Pomona	(Greeley County)
Marysville	Portis	Troy
Meade	Potwin	Turon
Medicine Lodge	Powhattan	Udall
Melvern	Pratt	Utica
Meriden	Preston	Valley Center
Merriam	Pretty Prairie	Valley Falls
Mildred	Protection	Vermillion
Milton	Quenemo	Viola
Minneapolis	Quinter	Virgil
Minneola	Randall	Wakeeney
Moline	Randolph	(Trego County)
Moran	Ransom	Wakefield
Morrill	Reading	Waldo
Mound City	Redfield	Walnut
Moundridge	Republic	Walton
Mound Valley	Robinson	Wamego
Mount Hope	Rock Creek	Washington
Mulberry	Rosedale	Waterville
Mulvane	Rose Hill	Wathena
Muscotah	Rossville	Waverly
Narka	Russell	Welda
Natoma	Russell Springs	Wellington
Neodesha	Sabetha	(Sumner County)
Neosho Falls	Salina	Wellsville
Neosho Rapids	Savonburg	Westmoreland
Ness City	Sawyer	Westphalia
Newton	St. Francis	Wetmore
New Ulysses	St. John	White City
(Grant County)	St. Marys	White Cloud
Nickerson	Scandia	White Water
(Reno County)	Scott City	Whiting
Norton	(Scott County)	Wichita
(Norton County)	Seranton	Williamsburg
Nortonville	Sedan	Wilsey
Norwich	Sedgwick	Wilson
Oakland	Seneca	Winchester
Oakley	Severance	Winfield
Oberlin	Severy	Winona
(Decatur County)	Sharon	Yates Center

Requirements for Graduation

For graduation, one must complete one of the four-year courses as shown elsewhere. These are believed to provide for the necessities of most students who seek an institution of this kind, and departures from the specified work are not encouraged. Under special conditions, however, such College substitutions are allowed as the interests of the student demand. The total requirement, including military science or physical training, is about 134 hours, or semester credits, a semester credit being one hour of recitation or lecture work, or three hours of laboratory work a week, for one semester of eighteen weeks. A student, to be considered as a candidate for graduation, must have done his last year's work in residence. In special cases, candidates would be considered who have done three full years of work here and have done their last in an institution approved by the faculty.

DEGREES

The degree of bachelor of science (B. S.) is conferred upon those completing the four-year course in agriculture, mechanical engineering, electrical engineering, civil engineering, flour-mill engineering, architecture, industrial journalism, home economics, or general science.

The degree of doctor of veterinary medicine (D. V. M.) is conferred upon those completing the four-year course in veterinary medicine.

The degree of bachelor of agriculture is conferred upon students who have completed the freshman and sophomore work of the four-year course in agriculture, who have been conspicuously successful in farming for a period of five years under the supervision of the faculty of the College, and who have furnished the faculty, through the Dean of the Division of Agriculture, acceptable reports of their work and progress.

CERTIFICATES

A certificate in agriculture is granted students completing the first two years of the four-year course in agriculture.*

A certificate is granted to those completing the two-year short course in agriculture.

A certificate is granted to those completing the one-year course in lunch-room management.

A certificate is granted to those completing the housekeepers' course, which lasts for one semester.

A certificate is granted to those who complete the eight-weeks creamery short course.

A certificate is granted to those completing any one of the short courses in mechanic arts.

* Under certain conditions and restrictions, students of mature years who can not spend four years in college, and who may be applicants for the degree of bachelor of agriculture or for the certificate in agriculture, may, on the completion of all of the work required in the freshman year, have the privilege of selecting such courses in advance of the sophomore year, under the advice and with the approval of the Dean of the Division of Agriculture, as may be especially adapted to their needs; but in no case can courses based on prerequisites not yet completed be undertaken.

ADVANCED DEGREES

The degree of master of science is conferred upon graduates of this College and upon those of other institutions, upon complying with conditions, the details of which vary with the undergraduate course of study pursued by the student, and the lines in which the graduate study is taken.

From graduates of standard institutions, including graduates of this College of the class of 1917 or later, nine months of residence and at least thirty-two semester hours of work are required. In case the undergraduate work previously taken does not prepare adequately for the graduate work proposed, deficiencies must be made up by study of any necessary undergraduate subjects; for these credit is not allowed on the graduate work proper.

Approximately two-thirds of the graduate work is given to a major subject and one-third to one or more minors. The nature and the distribution of the major and the minors is determined in each individual case by a committee consisting of the dean of the division and the head of the department in which the major is to be taken. The minor or minors must be taken in departments other than that in which the major work is done. Two-thirds of the total graduate credits may be allowed on account of original research, and four credits on the major or minors may be granted for research conducted in connection with instructional duties or departmental investigations in this institution or elsewhere.

A candidate for the master's degree must present a thesis consisting of a clear statement of the investigation of some worthy original problem. This is in the field of the student's major line of study, and is evaluated for credit against the major requirements. The preliminary copy of the thesis must be submitted for approval previous to April 1 of the year in which the degree is to be conferred. Two complete copies of the thesis, as approved, must be prepared, one for deposition in the College library, the other for the department in charge of the investigation recorded. These copies must be in hand in satisfactory form before May 15 of the year in which the degree is to be conferred.

A candidate for the master's degree is subject to a rigid oral examination, covering both the general and special fields of his preparation, and including his thesis, by a committee consisting of his dean and the heads of the departments in which his major and regular minors have been taken.

Immediate supervision of the assignment of a graduate student is in charge of the dean of the division in which the major work is done, but the full responsibility for the successful conduct of the graduate work is lodged in a representative standing committee of the Faculty, and this committee has the right to pass on all courses offered, on all assignments taken out, and on the standing of all graduate students.

A senior student whose time is not fully occupied may, by arrangement with the dean of the division and the head of the department in which he expects to do his major work, be assigned to subjects that will count toward the degree of master of science.

For graduates of this institution, up to and including the class of 1916, in addition to the requirements as stated in the foregoing, thirty-two semester hours, or their equivalent, are required. These additional credits are designed as supplementary minors, and are derived from studies that are intended to strengthen the student's general preparation. The supplementary minors must be in subjects of college grade, and may be obtained in residence, by correspondence, or at other approved institutions. Credits due a student on account of junior or senior honors are applied against supplementary minors.

PROFESSIONAL DEGREES IN ENGINEERING AND ARCHITECTURE

Graduates in engineering or in architecture from this College previous to 1917 who have been engaged in engineering or architectural practice for a period of five years or more, and graduates in 1917 or later who have been engaged in engineering or architectural practice for a period of three years or more, will be granted the professional degrees of M. E., C. E., E. E. Agr. E., F. M. E., or Architect under the following conditions:

The graduate to be eligible to a degree must submit a statement of his experience and a thesis covering some phase of his practice. This thesis and experience must be approved by the head of the department in which the degree is requested, by the Dean of the Division of Mechanic Arts, and by the College Committee on Graduate Study, before the granting of such a degree will be recommended to the College Faculty and to the Board of Administration.

FELLOWSHIPS

Fellowships have been established for some years by action of the Board, and are available in several departments of the College. Fellowships are granted to graduate students, who are to devote one-half of their time during the nine months of the regular school year to such work as may be laid out for them by the head of the department in which the fellowship is held. The remaining half-time is to be devoted to graduate study. These fellowships each yield \$400 annually. During the College year 1916-'17 there were seven fellowships in the Division of Agriculture and two in the Division of General Science. Applications for such fellowships should be made to the dean of the division in which the applicant expects to do his major work.

Two fellowships, each two years in duration, are established in engineering. The holder is expected to devote eleven months of the year to the work laid out, and receives from the College \$500 annually. To be eligible for appointment, the applicant must be a graduate of a technical course of a school or college of recognized standing. Preference will be given to those who have had some commercial experience along the lines of research to be followed. Applications for engineering fellowships should be made to the Dean of the Division of Mechanic Arts, and should state the lines of work that the applicant particularly desires to follow.

STUDENT LOAN FUNDS

THE ALUMNI LOAN FUND. The Alumni Association of the Kansas State Agricultural College has created a loan fund, chiefly by means of payments by which the alumnus is relieved from further regular dues in the association. Members are due to pay the association \$1 a year, and on payment of \$20 in one sum they are relieved from such dues. The fund so created is lent to students at 5 per cent per annum. The fund is administered by a committee appointed by the directors of the Alumni Association. The committee announces no specific rules governing the granting of loans, but in general gives preference to smaller amounts on short time over larger amounts which can not be paid for several years. Alumni are urged to add to the funds thus made available to worthy students. Students wishing loans from this fund may address Chairman of the Alumni Loan Fund Committee, Kansas State Agricultural College, Manhattan, Kan.

THE HENRY JACKSON WATERS LOAN FUND. The Henry Jackson Waters loan fund consists of the royalties received from the Kansas sales of President Waters' textbook, *The Essentials of Agriculture*. The royalties so far have amounted to slightly over \$1000, which sum has been augmented by gifts of \$100 each from Governor Capper, and L. R. Eakin, of Manhattan, and by smaller amounts received from some others. The entire amount has been loaned nearly all the time. The total number of students who have been benefited by this fund is twenty-seven. The fund is administered by a committee appointed by the President of the College and approved by the Board of Administration. The rules for the loans are likewise approved by the Board. The rules allow emergency loans of \$25 to any student who has completed two semesters of work in this College. Juniors may borrow \$100 and seniors may borrow \$150. Applications for loans should be made to Chairman of the Student Loan Fund Committee.

COLLEGE SOCIAL CLUB LOAN FUND. At the close of the last college year the College Social Club voted to use the balance in its treasury (\$40) for a loan to some one of the young women students. The loan is administered by a committee representing the College Social Club. Further information regarding this fund can be obtained by addressing Dean Mary P. Van Zile, Kansas State Agricultural College, Manhattan, Kan.

STATE FEDERATION OF WOMEN'S CLUBS' LOAN FUND. Each year several of the young women students of the Kansas State Agricultural College are beneficiaries of the State Federation of Women's Clubs through the administration of its liberal young women's student loan fund. Information regarding this fund also can be obtained by addressing Dean Mary P. Van Zile.

SCHOLARSHIPS

MILLING INDUSTRY. During the summer of 1915 the Kansas Flour Mills Company offered \$300 annually to advanced students specializing in milling industry. This sum has been divided into three scholarships,

which are open to students in the Division of Agriculture, General Science, and Mechanic Arts who are specializing in flour milling and other milling-industry work. They are awarded on or before June 1 of each year, and except in unusual cases are not awarded to students below junior standing. Other things being equal, preference is given to residents of the State of Kansas.

In awarding these scholarships the following points regarding the student are considered: Course of study pursued, scholarship, character and personality, and financial condition. The stipend is divided into ten monthly payments, the first payment being due September 1 and the last June 1.

DEBATE. In the Department of English two scholarships of the value of \$100 each, one for men and one for women students, are offered annually for proficiency in intercollegiate debating.

PRIZES AND MEDALS

STOCK JUDGING. The Saddle and Sirloin Club offers four medals, one gold, one silver, and two bronze, to students obtaining the four highest places in the club's stock-judging contest. The same organization offers prizes of books for stock judging. The faculty of the Department of Animal Husbandry offers prizes of books or papers on stock judging.

DAIRY JUDGING CONTEST. The Student Dairy Association each year holds a dairy judging contest, and offers a gold, a silver and a bronze medal to students obtaining the three highest places.

PLAY WRITING. The Purple Masque Dramatic Fraternity offers each year a prize of \$50 for the best original play written by a student of the Kansas State Agricultural College and suitable for presentation by the fraternity.

ORATORY. The literary societies, through the Oratorical Board, offer each year, in the Intersociety Oratorical Contest, the following prizes:

First prize, gold medal and \$25.

Second prize, silver medal and \$15.

Third prize, bronze medal and \$10.

The Oratorical Board also finances the sending of a representative from the College to the annual Peace Oratorical Contests, to the winners of which valuable prizes in money are awarded.

The Public Speaking Department sends to the annual Missouri Valley Contest an orator as the representative of the College. In this contest valuable prizes in money and medals are awarded.

SHORT-STORY WRITING. The Quill Club offers annually a gold medal to the student of Kansas State Agricultural College writing the best short story in a contest held by this organization.

MILITARY TRAINING. In the Department of Military Training prizes and medals are offered as follows:

1. The Knostman cup, offered by the Knostman Clothing Company, of Manhattan, to the company winning the intercompany basket-ball series.

2. The Henderson Ames cup, donated by the Henderson Ames Company of Kalamazoo, Mich., to the company winning the outdoor Henderson Ames match.

3. The Governor Hodges cup, donated by ex-Governor Hodges to the company having the highest percentage on outdoor range.

4. The Metcalf cup, donated by General W. S. Metcalf to the member of the Rifle Club having the highest aggregate in gallery matches of the United States military colleges.

5. A saber or pistol to the captain having the best-drilled company.

6. A silver-mounted saber knot to the first lieutenant of the best-drilled company.

7. A silver-mounted saber knot to the first lieutenant of the best-drilled company.

8. A silver medal to the corporal of the best-drilled squad.

9. A bronze medal to each private of the best-drilled squad.

10. A gold medal to the best-drilled cadet.

The team members of the College Rifle Club winning the series of intercollegiate matches in gallery-practice competition are issued individual marksmanship medals by the National Rifle Association of America.

General Information

DUTIES AND PRIVILEGES

Good conduct in general, such as becomes men and women everywhere, is expected of all students. Every possible aid and stimulus toward the development of sound and rational character, and toward the formation of high standards of personal honor and ideals of conduct, is given by the various Christian organizations of the College and the town. Every student is accordingly expected to render a good account of himself in the College community life. For those who are high-minded and reasonable, no other requirements need be expected. On the other hand, the demands of the College life leave no room for the idle or self-indulgent, for those who are too reckless to accept reasonable or wholesome restraint, or for those who are too careless or indifferent to take proper advantage of their opportunities. The College discipline is confined chiefly to sending away those whose conduct, after fair trial, makes their further attendance at the College unprofitable or inadvisable.

Absences from class or laboratory periods must be accounted for to the instructor concerned. Permission for absence from College for one or more days must be secured in advance from the dean of the division in which the student is registered. Students can not honorably leave the College before the close of a term except by previous arrangement with the deans concerned.

Opportunities for general scientific, literary and forensic training are afforded, in addition to the College courses, by various literary and scientific societies and clubs. The Science Club, meeting monthly, admits to

membership all instructors and students interested in science. Papers given at the meetings of the Science Club represent original work in science done at the institution. The program is further characterized by free discussion of the papers presented and by general scientific notes and news contributed by the members. The numerous literary and professional societies, which are described elsewhere in the catalogue under the title "Student Organizations," also afford excellent training in their diverse lines.

At various times during the year the College halls are opened for social, literary, musical, and dramatic entertainments furnished by lecture courses, by the literary societies, by the Department of Music, by the Dramatic Club, by the Oratorical Association, and by other organizations of students and instructors. Addresses by prominent speakers, men of affairs, and persons prominent in scientific, educational, and social work are of frequent occurrence.

EXPENSES

Tuition is free. A matriculation or entrance fee of \$5 and an incidental fee of \$5 a semester and \$5 for the summer term are charged all students resident in Kansas. For nonresidents a matriculation fee of \$10 and an incidental fee of \$10 a semester and \$10 for the summer term are charged. The eight-weeks short-course students pay an incidental fee of \$3 and a sick-benefit fee of 50 cents; short-course students remaining more than eight weeks pay the same incidental and health fees as the regular students. Each student, except as noted in the preceding statement, pays with his incidental fee a sick-benefit fee of \$1 each semester and \$1 for the summer term. In return for this he receives the services of the College physicians for any illness contracted while in College. The fee does not include the cost of medicine, surgical operations, reduction of fractures, hospital fees, or the treatment of chronic conditions. As far as possible, and provided the students requesting such services room within the city limits, the College physicians visit in their rooms students who are too ill to go to the physicians' office. Class instruction in music is free; for individual instruction a fee is required. For unexcused late registration the student is charged \$1. Students, when graduating, pay a commencement fee of \$5 to cover the cost of the diploma and other commencement expenses. No other fees are charged. In all laboratories students are required to pay for apparatus broken or lost, and for supplies.

Rooms and board are not furnished by the College. Table board in private families and at boarding houses varies from \$3.25 to \$4.50 a week, the average* being about \$3.70. Rooms are obtainable at from \$5 to \$10 a month when occupied by one person, the average room rent paid in these circumstances being \$6.80. In cases where a room or suite of rooms is occupied by more than one person the average cost for each person is \$5.50 a month. The higher-priced accommodations include light, heat, and bath.

* The averages here given are from data received in 1915 from about 1000 students fairly representing all classes. Board, at least, is now higher.

Some students board themselves at less cost than the prices charged for table board, and unfurnished rooms may sometimes be obtained very cheaply. The average expense for washing is 55 cents a week. Books cost on the average about \$5.50 a term, the amount being smaller in the lower classes.

Each young man who takes military drill is required to have a military uniform, costing about \$27, and each young woman who takes physical training must have a physical training suit, costing about \$4. Expenditures, aside from clothing, vary according to individual tastes and circumstances; they average \$265 a year.

BOARDING AND ROOMING HOUSES

The Christian Associations of the Agricultural College keep on file the official list of boarding and rooming houses. All correspondence relative to boarding accommodations, in advance of the student's arrival in Manhattan, may be addressed to the Secretary of the Young Men's Christian Association, to the Secretary of the Young Women's Christian Association, or to the Registrar of the College. Upon arrival in Manhattan, young men should go directly to the Y. M. C. A. building, and the young women to the Y. W. C. A. offices at the College, taking the street car from either depot. The cars from Union Pacific station pass directly by the association building. Students leaving the Rock Island station on street car should ask for transfer to the line that passes the association buildings. For three days before the opening of the fall term and for the first three days after the opening day, committees from these associations meet trains and assist in directing new students, either to the association buildings or directly to proper boarding places. The associations make no charge for their services or for lists of all approved boarding places, and new students should depend absolutely upon the recommendations of the association committees.

SELF-SUPPORT

The courses of instruction are based upon the supposition that the student is here for study, and therefore a proper grasp of the subjects can not be obtained by the average student unless the greater part of his time is given to College work. Students of limited means are encouraged and aided in every possible way, but unless exceptionally strong, both mentally and physically, such students are advised to take lighter work by extending their courses, in case they are obliged to give any considerable time to self-support. As a rule, a student should be prepared with means for at least a semester, as some time is required in which to make acquaintances and to learn where suitable work may be obtained.

There are various lines in which students may find employment. The College itself employs labor to the extent of about \$1200 a month, at rates varying from 15 to 20 cents an hour, according to the nature of the employment and the experience of the employee. Most of this labor is upon the College farm, in the orchards and gardens, in the shops and

the printing office, for the janitor, etc. Various departments utilize student help to a considerable extent during the vacations. Students demonstrating exceptional efficiency, ability, and trustworthiness obtain limited employment in special duties about the College. Many students secure employment in various lines in the town, and some opportunity exists for obtaining board in exchange for work, with families either in town or in the neighboring country. Labor is universally respected in the College community, and the student who remains under the necessity of earning his way will find himself absolutely unhampered by discouraging social conditions. Indeed, about one-quarter of the students support themselves wholly, while a third support themselves in part. False standards regarding physical work do not exist, and are not tolerated by the board of instruction or by the student body as a whole. Absolutely democratic standards prevail at the College, and students are judged on the basis of their personal worth and efficiency alone.

Students are assisted to obtain employment by means of the employment bureaus maintained by the Young Men's Christian Association and by the Young Women's Christian Association of the College, with secretaries of which organizations correspondence is encouraged.

BUSINESS DIRECTIONS

General information concerning the College may be obtained from the President or the Registrar. Financial matters are handled through the office of the Financial Secretary.

Scientific and practical questions, and requests for special advice along lines in which the College and the Experiment Stations are prepared to give information, should be addressed to the heads of the departments concerned with the work regarding which information is sought.

Applications for farmers' institutes should be made as early in the season as possible to the Division of College Extension. Applications for the publications of the Agricultural Experiment Station should be addressed: Director of the Agricultural Experiment Station, Manhattan, Kan.

Donations to the Library should be addressed to the Librarian, and donations to the Museum to the Curator of the Museum.

STUDENT ASSEMBLY

The Student Assembly is held from eleven to twelve o'clock each Monday morning. At this time the library, offices, classrooms, and laboratories are closed and the students gather in the College Auditorium. These assembly exercises consist of devotional services, music, and addresses. The devotional exercises are conducted by members of the Faculty, by resident ministers of the various denominations, or by prominent visitors. Excellent music is provided by the College Orchestra, by members of the Department of Music, and by available outside talent. In addition to the short, pointed addresses delivered by the President and by members of the faculty, many prominent leaders of state and national reputation are invited to address the assembly. Thus the Student Assembly has become a center of true culture and enlightenment.

Although attendance is not compulsory, it is common to see nearly two thousand enthusiastic students present during these exercises.

COLLEGE PUBLICATIONS

The official organ of the College is *The Kansas Industrialist*, published and printed at the College weekly by the Department of Industrial Journalism and Printing. Its pages are filled with articles of interest, with special reference to agriculture and the industries. Particular attention is paid to information concerning the work of the College, to investigations of the Experiment Stations, and to local and alumni news. *The Kansas Industrialist* will be sent to any address for seventy-five cents a year. The alumni may have *The Kansas Industrialist* free upon application.

The Department of College Extension issues a monthly publication entitled *Agricultural Education*, of special interest to institute members. The students of the College publish a semi-weekly periodical, *The Kansas State Collegian*, in the interest of the students at large. This paper is edited and managed by a staff elected by students. A College annual, *Royal Purple*, is published each year by the senior class.

EXAMINATIONS

Examinations are held at the last regular recitation periods of the respective studies at the end of each semester. Whether the examination is to extend over the last two periods or over one only is left to the decision of the individual instructor.

Any student who receives a grade of E for the term, in any subject, and whose absences for all causes from the class in such subject do not exceed one-tenth of the number of times the class is scheduled to meet during the semester, may be excused from the final examination in that subject, at the discretion of the instructor; provided, however, that instructors are to announce such exemption lists in their respective subjects not earlier than the last session of the class preceding the final examinations.

Examinations to remove conditions are held on the fourth Saturday of each semester. A student who has received the grade C is entitled to take such special examination, provided the instructor or the department head be notified of the student's desire to take the examination not later than the Tuesday evening preceding the Saturday set for the examinations. If a subject in which a student is conditioned is not passed at the first opportunity, the grade is changed from C to F.

Permission for examination in subjects not taken in class must be obtained, on recommendation of the professor in charge, from the dean of the division in which the student is assigned. Permission to take such examination is not granted unless the preparation for it is made under an approved tutor. All such examinations are under the immediate supervision of the professor in whose department the subject falls.

GRADES

Student grades are designated by the letters E, G, M, P, C, F, and U, having the following significance and order of rank:

The grade E designates really distinguished achievement, and is the net resultant of exceptionally good mental ability in conjunction with serious application. It is expected that this grade will not include more than ten per cent of all grades given a class, and usually will include about five per cent.

The grade G represents superior achievement, better than that exhibited by the average student, but not distinguished. It is recognized as a mark of considerable honor and is the resultant of high ability and fair application, or of fair ability and serious application. The percentage of students assigned this grade will depend somewhat upon the number assigned grade E, but the sum of grades E and G should approximate twenty-five per cent of all grades assigned.

The grade M represents the standing of about half of all students in the College. It means achievement equal to that of the average of students, and includes about half of all students' grades. It indicates neither superior nor inferior accomplishment.

The grade P, meaning passed, represents achievement of a grade below that of the average of students. It indicates a student's position as being in the upper part of the lower fourth of the class and his work as being such as may be described as poor, or inferior. The number of grades P awarded, together with the grades C and F, should not, on the whole, exceed twenty-five per cent of all, and are expected to include about that proportion.

The grade C, meaning conditioned, is the symbol used to represent two types of inferior work: (a) that which is deficient in quality, and (b) that which is satisfactory as to quality but inadequate as to quantity. The results of examinations to remove conditions are reported simply as P (passed) or F (failed), and such examinations not taken, or taken and not passed, are recorded as F.

The grade F, meaning failure, is used to indicate work that is so unsatisfactory as to require that the work be repeated in class or under an approved tutor.

The letter U, meaning unfinished, is reported when, in the judgment of the instructor, the student deserves further time to complete work which has been interfered with by illness or other excusable cause of absence or disability. This is only a temporary report and in no way prejudices the student's final grade in a course.

PENALTIES

A student who, at the end of the semester, receives grades below passing in fifty per cent or more of the work to which he is assigned is required to leave College for at least one semester unless there are sufficiently extenuating circumstances, in which case his dean may suspend the rule and allow an assignment to twelve semester credits of work.

Any student who, at the end of a semester, receives grades below passing in twenty-five per cent of his assigned work is allowed not more than seventy-five per cent of regular work the next semester.

Any student who is found to be persistently inattentive to study is at once temporarily suspended by his dean, and reported to the President for permanent suspension.

HONORS

In each of the divisions of the College "junior honors" are awarded at Commencement to not more than five per cent of the junior class having the highest standing up to the close of the junior year.

In a similar manner "senior honors" are awarded to not exceeding five per cent of the senior class having the highest standing to the close of the senior year.

HONOR SOCIETIES

A chapter of Phi Kappa Phi, an honor scholarship fraternity, membership in which is open to honor graduates of all departments of American universities and colleges, was installed at the Kansas State Agricultural College on November 15, 1915. The eligibility of undergraduates to membership is determined on the basis of their scholarship. The candidates are elected to membership at the October and April meetings of the chapter. Besides this, there are a number of honor fraternities, sororities and societies which are open to students in different divisions of the College or in different activities. These are treated later under the heading Student Organizations.

CREDITS FOR EXTRA WORK

Activities connected with the College, but not provided for by any of the courses of study, either as required subjects or as electives, are designated as *extra subjects*.

No credit is given for extra work of any kind unless the student is regularly assigned to it in accordance with the general rules governing assignments, and it is done under the constant supervision of a College officer, who sees that a proper standard is maintained and reports a grade for record.

No student may be assigned to extra work for credit except upon the written recommendation of the instructor in charge of the work. This recommendation is filed in the office of the student's dean, and is effective until revoked.

Credits earned for extra work may be counted as part or all of the electives in any of the College courses. In courses that do not include electives, credits for extra work are available only as substitutions for required work, and must be approved in the regular way before becoming effective. A total of not more than eight semester credits may be allowed a student for extra work, and not more than two of these may be obtained in any one semester.

The number of semester credits that may be allowed for extra work is as follows:

Subject.	Per semester.	Total.
Physical training	1	4
Military science (unpaid).....	1	4
Orchestra	1	4
Band	1	4
Choral Society	1	4
Debate	2	4
Oratorical contest	2	4
Kansas State Collegian journalism.....	1	4

BIBLE STUDY

Bible study is an elective. Two semester credits are granted for each completed one-year course. Credit may be granted to any one student for not more than two courses. Teachers of classes are to be approved as tutors, and the supervision of the work is placed in the Department of Education. This department also conducts the examinations for credit in Bible study.

CLASSES

The minimum numbers for which classes are organized are as follows:

School of Agriculture	18
Freshmen or sophomores	12
Juniors or seniors	7

This rule is varied only by special permission of the Board of Administration.

School of Agriculture

HARRY LLEWELLYN KENT, *Principal*

ADA RICE, *Assistant Principal*

The School of Agriculture is organized to meet the needs of young men and young women of Kansas who may need instruction more closely identified with the life of the farm, home and shop than that provided by the high schools of the State. It is also intended to meet the needs of those men and women who find themselves for any cause unable to complete an extensive course of collegiate instruction, yet who feel the necessity of a practical training for their activities in life. A large part of the student's time in the School will be spent in the laboratories and in contact with the real objects of his future work. An element of culture and general information is provided for in several terms of English for each course, and in work in history, economics, citizenship, physics, and chemistry.

The School of Agriculture is not a school preparatory to the College. Its sole purpose is to fit men and women for life in the open country, and to make country life more attractive; to make the workshop more efficient; in short, to dignify and to improve industrial life. It is not established to entice students away from the high school. It is for those of every walk in life who wish a larger view and greater skill in doing the world's work.

All the resources of the College are at the disposal of the School of Agriculture. Its students have every advantage possessed by students in the College.

THE COURSE OF STUDY

The course in agriculture emphasizes the growing of crops and the raising of livestock. A minimum of theory and a maximum of practical work bring the student into close contact with the actual conditions of farm life.

The course in domestic science emphasizes the care of the home. Home decoration, home sanitation, cookery, and sewing receive careful attention.

The course in mechanic arts leads to a trade. It is designed to shorten the time of apprenticeship and to prepare the way for skilled workmanship in shop or factory. The great amount of time spent in the shops should easily lead to skill and efficiency in subsequent work.

ADMISSION

Students who are fourteen years of age or older and who have completed the eighth grade of the public schools are admitted without ex-

amination. Students who have not completed the eighth grade are examined in arithmetic, United States history, English grammar, geography, reading, and spelling. Students who have done work in the public high schools receive credit for the work done. Maturity in years and practical experience are given due consideration, but students should not consider these qualifications alone sufficient to admit them. Wherever there is question about a student's qualifications for entering, he should correspond with the Principal of the School of Agriculture before coming.

TIME OF OPENING

All candidates for admission to the School of Agriculture should present themselves for registration at the College September 10 to 12, inclusive. The Principal of the School of Agriculture is charged with the execution of all College and faculty rules relating to the enrollment of students in classes and their choice of studies. Students entering under the age of seventeen years are required to complete one of the three-year courses as outlined before they may choose work not included in the course.

It is greatly to the advantage of the prospective student to see to it that his certificate of graduation, properly filled out, be sent to the College as soon as possible after graduation. A permit to register will then be sent him by the Registrar in advance of his coming in September; this will greatly facilitate the work of entrance. The student will present this permit at the registration room in Nichols Gymnasium and will not be compelled to wait his turn to meet the committee on admission.

Upon registration each student receives a certificate of his standing, which he presents to the Principal of the School, who is charged with the duty of enrolling students in classes, selecting and arranging subjects, and assigning hours.

GRADES AND FAILURES

Examinations are held at stated periods and at such other times as the Faculty may provide. Absence from examination, or ten or more unexcused absences from class periods, severs a student's connection with the institution, which connection can be renewed only through the action of the Principal of the School. Any withdrawals from school or class must be authorized by the Principal; otherwise, continued absence is construed as failure. Parents or guardians are furnished a copy of the record of the student's work at the close of any term if they so desire.

Course in Agriculture

(SCHOOL OF AGRICULTURE)

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR

FIRST SEMESTER	SECOND SEMESTER
Stock Judging An. Husb. 51..... 3(0-6)	Fruit Growing Hort. 51..... 3(2-2)
Elementary Farm Machinery Farm Mach. 51..... 2(1-2)	Blacksmithing I Shops 69..... 2(0-4)
Carpentry I Shop 51..... 2(0-4)	Gas Engines I Steam and Gas 51, 54.. 2(1-2)
Elementary Botany Bot. 51..... 3(2-3)	Elementary Zoölogy Zoöl. 51..... 3(2-3)
Industrial Arithmetic A Math. 51..... 4(4-0)	Applied Mathematics A Math. 55..... 4(4-0)
English I Engl. 51..... 4(4-0)	English II Engl. 54..... 4(4-0)
Military Science I Mil. Tr. 51..... 1(0-3)	Military Science II Mil. Tr. 52..... 1(0-3)
Music * Music..... ————	Music * Music..... ————
Hygiene and Social Problems M Phys. Ed. 60..... R	Hygiene and Social Problems M § Phys. Ed. 60..... R

SECOND YEAR **

FIRST SEMESTER	SECOND SEMESTER
Farm Crops Agron. 51..... 5(4-2)	Dairying Dairy Husb. 51..... 2(1-2)
Physiology and Hygiene A Vet. 51..... 3(3-0)	Farm Insects Ent. 61..... 2(2-0)
Beginning Poultry Poult. Husb. 51..... 2(1-2)	Soils and Fertilizers Agron. 56..... 3(2-2)
Breeds and Breeding An. Husb. 53..... 2(2-0)	Livestock Production An. Husb. 55..... 3(3-0)
Elementary Chemistry Chem. 51..... 4(3-2)	Elementary Agricultural Chemistry Chem. 53..... 4(3-2)
English III Engl. 61..... 4(4-0)	English IV Engl. 64..... 4(4-0)
Military Science † I Mil. Tr. 51..... 1(0-3) or	Military Science † II Mil. Tr. 52..... 1(0-3) or
Physical Training M-I Phys. Ed. 51..... 1(0-3)	Physical Training M-II Phys. Ed. 52..... 1(0-3)
Music * Music..... ————	Music * Music..... ————
Hygiene and Social Problems M § Phys. Ed. 61..... R	Hygiene and Social Problems M § Phys. Ed. 60..... R

* Elective.

† All male students are required to take Military Science during the first year and Physical Training during the second year of their attendance in the School of Agriculture.

** See page 139 for announcement of summer project or demonstration for credit.

§ Unless taken some previous semester. This course must be taken during the first year of the student's attendance.

THIRD YEAR ††

FIRST SEMESTER	SECOND SEMESTER
Farm Management	Agricultural Bacteriology
Agron. 61 3(2-2)	Bact. 51 3(2-2)
Diseases of Farm Animals	Rural Economics
Vet. 61 2(2-0)	Econ. 52 3(3-0)
Elementary Grain Marketing	American Nation † II
Mill. Ind. 51 2(2-0)	Hist. 60 4(4-0) or
American Nation † I	Civics
Hist. 59 4(4-0)	Hist. 63 4(4-0)
Physics A-I	Physics A-II
Physics 51 4(3-2)	Physics 52 4(3-2)
English V	Farm Writing
Engl. 71 3(3-0)	Ind. Jour. 51 4(2-4)
Military Science † I	Military Science † II
Mil. Tr. 51 1(0-3) or	Mil. Tr. 52 1(0-3) or
Physical Training M-I	Physical Training M-II
Phys. Ed. 51 1(0-3)	Phys. Ed. 52 1(0-3)
Music *	Music *
Music	Music
Hygiene and Social Problems M §	Hygiene and Social Problems M §
Phys. Ed. 60 R	Phys. Ed. 60 R

Course in Mechanic Arts

(SCHOOL OF AGRICULTURE)

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR

FIRST SEMESTER	SECOND SEMESTER
English I	English II
Engl. 51 4(4-0)	Engl. 54 4(4-0)
Algebra I	Algebra II
Math. 61 4(4-0)	Math. 62 4(4-0)
Freehand and Object Drawing	Geometrical Drawing
Arch. 51 3(0-6)	Arch. 52 3(0-6)
Gas Engines I	Traction Engines I
Steam and Gas 51, 54.. 2(1-2)	Steam and Gas 66..... 2(0-4)
Carpentry I	Molding I
Shop 51 2(0-4)	Shop 96 2(0-4)
Concrete Construction I	Elementary Botany
Ap. Mech. 51, 55..... 2(1-2) or	Bot. 51 3(2-2) or
Elementary Botany	Concrete Construction I
Bot. 51 3(2-2)	Ap. Mech. 51, 55..... 2(1-2)
Blacksmithing I	Blacksmithing II
Shop 69 2(0-4)	Shop 72 2(0-4)
Military Science I	Military Science II
Mil. Tr. 51 1(0-3)	Mil. Tr. 52 1(0-3)
Music *	Music *
Music	Music
Hygiene and Social Problems M	Hygiene and Social Problems M §
Phys. Ed. 60 R	Phys. Ed. 60 R

* Elective.

† By special permission students may substitute Ancient History I and II or Modern History I and II for corresponding terms of American Nation.

‡ All male students are required to take Military Science during the first year and Physical Training during the second year of their attendance in the School of Agriculture.

†† Third year students may, with the consent of the principal, elect for substitution: Traction Engines, Gas Engines, Blacksmithing, Concrete Construction, or Nursery Practice.

§ Unless taken some previous semester. All male students are required to take this course during their first year of attendance.

SECOND YEAR

FIRST SEMESTER	SECOND SEMESTER
English II Engl. 61 4(4-0)	English IV Engl. 64 4(4-0)
Plane Geometry I Math. 66 4(4-0)	Plane Geometry II Math. 67 4(4-0)
Physics A-I Physics 51 4(3-2)	Physics A-II Physics 52 4(3-2)
Shop Drawing I Ap. Mech. 75, 80..... 3(1-4)	Shop Drawing II Ap. Mech. 85, 90..... 3(1-4)
Machine Shop I Shop 87 3(0-6)	Strength of Materials Ap. Mech. 70..... 3(3-0)
Military Science † I Mil. Tr. 51..... 1(0-3) <i>or</i>	Military Science † II Mil. Tr. 52..... 1(0-3) <i>or</i>
Physical Training M-I Phys. Ed. 51..... 1(0-3)	Physical Training M-II Phys. Ed. 52..... 1(0-3)
Hygiene and Social Problems M § Phys. Ed. 60..... R	Hygiene and Social Problems M § Phys. Ed. 60..... R
<i>Elective, 3 credits from following:</i>	
Concrete Construction II Ap. Mech. 60..... 3(0-6)	Concrete Construction III Ap. Mech. 65..... 3(0-6)
Carpentry II Shop 54 3(0-6)	Carpentry III Shop 57 3(0-6)
Steam Engines and Boilers I Steam and Gas 75, 78.. 3(1-4)	Gas Engines II Steam and Gas 57..... 3(0-6)
Blacksmithing III Shop 75 3(0-6)	Blacksmithing IV Shop 78 3(0-6)

THIRD YEAR

FIRST SEMESTER	SECOND SEMESTER
Modern History I † Hist. 55 4(4-0)	Modern History II † Hist. 56 4(4-0)
Solid Geometry Math. 71 4(4-0)	Algebra III Math. 72 4(4-0)
Civics Hist. 63 4(4-0)	Economics Econ. 51 3(3-0)
Electricity I-S Elect. Engr. 51, 55..... 3(2-2)	English V Engl. 71 3(3-0)
Military Science † I Mil. Tr. 51..... 1(0-3) <i>or</i>	Military Science † II Mil. Tr. 1(0-3) <i>or</i>
Physical Training M-I Phys. Ed. 51..... 1(0-3)	Physical Training M-II Phys. Ed. 52..... 1(0-3)
Hygiene and Social Problems M § Phys. Ed. 60..... R	Hygiene and Social Problems M § Phys. Ed. 60..... R
<i>Elective, 5 credits from following:</i>	
Blacksmithing V Shop 81 3(0-6)	Blacksmithing VI Shop 84 3(0-6)
Machine Shop II Shop 90 2(0-4)	Machine Shop III Shop 93 3(0-6)
Carpentry IV Shop 60 2(0-4)	Carpentry V Shop 63 2(0-4)
Gas Engines III Steam and Gas 60..... 3(0-6)	Gas Engines IV Steam and Gas 63..... 3(0-6)
Traction Engines II Steam and Gas 69..... 2(0-4)	Traction Engines III Steam and Gas 72..... 2(0-4)
Steam Engines and Boilers II Steam and Gas 81..... 2(0-4)	Shop Drawing III Ap. Mech. 95..... 2(0-4)

† Ancient History I and II may be substituted for Modern History I and II.

‡ All male students are required to take Military Science during the first year and Physical Training during the second year of their attendance in the School of Agriculture.

Course in Home Economics

(SCHOOL OF AGRICULTURE)

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR

FIRST SEMESTER	SECOND SEMESTER
English I Engl. 51 4(4-0)	English II Engl. 54 4(4-0)
Sewing I Dom. Art. 51..... 2(0-4)	Sewing II Dom. Art. 52..... 2(0-4)
Cooking I Dom. Sc. 51..... 3(1-4)	Cooking II Dom. Sc. 52..... 3(1-4)
General Housekeeping I Dom. Sc. 61..... 3(3-0)	General Housekeeping II Dom. Sc. 62..... 3(3-0)
Industrial Arithmetic W Math. 52 4(4-0)	Elementary Design Home Art 51..... 3(0-6)
Household Insects Ent. 51 2(2-0)	Gardening Hort. 56 2(1-2)
Physical Training W-I Phys. Ed. 75..... 1(0-3)	Dairying Dairy Husb. 61..... 2(1-2) or
Music * Music ———	Carpentry H Shop 66 2(0-4)
Hygiene and Social Problems W Phys. Ed. 80..... R	Physical Training W-II Phys. Ed. 76..... 1(0-3)
	Music * Music ———
	Hygiene and Social Problems W § Phys. Ed. 80..... R

SECOND YEAR

FIRST SEMESTER	SECOND SEMESTER
English III Engl. 61 4(4-0)	English IV Engl. 64 4(4-0)
Elementary Chemistry Chem. 51 4(3-2)	Elementary Household Chemistry Chem. 52 4(3-2)
Sewing III Dom. Art. 53..... 2(0-4)	Sewing IV Dom. Art. 54..... 2(0-4)
Cooking III Dom. Sc. 53..... 2(0-4)	Cooking IV Dom. Sc. 54..... 2(0-4)
Economics Econ. 51 3(3-0) or	Applied Mathematics W Math. 56 4(4-0)
Civics Hist. 63 4(4-0)	Elementary Home Decoration Home Art 55..... 3(0-6)
Dress Design and Art Needlework Dom. Art. 61..... 2(0-4)	Physical Training W-II or W-IV † Phys. Ed. 76 or 78..... 1(0-6)
Physical Training W-I or W-III † Phys. Ed. 75 or 77..... 1(0-3)	Music * Music ———
Music * Music ———	Hygiene and Social Problems W § Phys. Ed. 80..... R
Hygiene and Social Problems W § Phys. Ed. 80..... R	

* Elective.

† Young women take physical training the first two years of their attendance.

§ Unless taken some previous semester. All women students are required to take this course during their first year of attendance.

THIRD YEAR

FIRST SEMESTER		SECOND SEMESTER	
English V		English VI	
Engl. 71	3(3-0)	Engl. 74	4(4-0)
Physics H-I		Physics H-II	
Physics 61	4(3-2)	Physics 62	4(3-2)
Ancient History I †		Ancient History II †	
Hist. 51	4(4-0)	Hist. 52	4(4-0)
Sewing V		El. Textiles and Millinery	
Dom. Art 55.....	2(0-4)	Dom. Art 62.....	2(0-4)
Household Bacteriology		Physiology and Hygiene H	
Bact. 61	3(2-2)	Vet. 52	4(4-0)
Elements of Poultry Keeping		Physical Training W-II or W-IV †	
Poult. Husb. 52.....	2(2-0)	Phys. Ed. 76 or 78.....	1(0-3)
Physical Training W-I or W-III †		Music *	
Phys. Ed. 75 or 77.....	1(0-3)	Music	—
Music *		Hygiene and Social Problems W §	
Music	—	Phys. Ed. 80.....	R
Hygiene and Social Problems W §			
Phys. Ed. 80.....	R		

Agricultural Courses

AGRONOMY

61. FARM MANAGEMENT. Third year, first semester. Class work, two hours; laboratory, two hours. Three semester credits. Prerequisites: Farm Crops; Soils and Fertilizers; Stock Feeding and Production.

The purpose of this course is to correlate the information relating to farming given in other agricultural courses and to make a study of farming as a business. The course involves a study of types of farming, the selection of a farm, proper distribution of capital in the farm business, arrangement of fields and farm buildings, the relation of livestock farming to crop farming, and the most profitable combination of these, together with their effect upon soil fertility. A system of account keeping that is adapted to farm conditions is considered. Text: Boss' *Farm Management*.

51. FARM CROPS. Second year, first semester. Class work, four hours; laboratory, two hours. Five semester credits. Prerequisite: Botany.

The course involves a study of both grain and forage crops, approximately one-half semester being given to each. Emphasis is placed upon the economic production of those crops which are of greatest importance in Kansas. The laboratory work is planned to acquaint the student with the different grain and forage plants and their habits of growing. Text: Wilson and Warburton's *Field Crops*.

56. SOILS AND FERTILIZERS. Second year, second semester. Class work, two hours; laboratory, two hours. Three semester credits. Prerequisites: Chemistry; Farm Crops.

The course involves a study of the physical nature of soils and their adaptation to crops, together with proper methods of handling to maintain good physical condition, to conserve moisture and to prevent wash-

* Elective.

† Young women take physical training the first two years of their attendance.

‡ American Nation I and II or Modern History I and II may be substituted for the corresponding terms of Ancient History.

§ Unless taken some previous semester. All women students are required to take this course during their first year of attendance.

ing and blowing. Means of maintaining the fertility of the soil, the care and use of barnyard manure; green manure and commercial fertilizers are also considered. In the laboratory and on field trips different soils are studied with reference to their physical properties and their relation to crops and methods of management. Text: Whitson and Walster's *Soils and Fertilizers*.

DAIRYING

61. DAIRYING. First year, second semester, in home economics; and second year, second semester, in agriculture. Lecture, one hour; laboratory, two hours. Two semester credits. Mr. Olson.

This course includes lectures on the various breeds of dairy cattle, milk and its composition, Babcock testing, separation and churning. Two individual lectures are given to the agricultural students on feeding the dairy herd and two additional lectures on cheese making to the home economics students.

Laboratory.—The laboratory work comprises the operation of the Babcock test, separating milk, churning, and soft-cheese making.

51. STOCK JUDGING. (See Animal Husbandry 51.) Mr. Fitch. Four weeks are given over to the judging of dairy cattle. The rest of the course is devoted to the study of the breeding and market types of horses, cattle, sheep, and swine, and is presented by the Department of Animal Husbandry.

HORTICULTURE

51. FRUIT GROWING. First year, second semester. Class work, two hours; laboratory, two hours. Three semester credits. Assistant Doerner.

This course includes a study of the principles of vegetable gardening and fruit growing. The first half of the semester is given to the problems of general fruit growing, and the vegetable gardening comprises practices in garden making and lectures during the last half of the semester.

56. GARDENING. First year, second semester. Class work, one hour; laboratory, two hours. Two semester credits.

The practices and principles involved in the cultivation and care of home and market gardens are here studied.

ANIMAL HUSBANDRY

51. STOCK JUDGING. First year, both semesters. Laboratory, six hours. Three semester credits. Mr. Gatewood, Mr. Paterson, Mr. Gray, and Mr. Aubel.

This course consists in score-card practice in judging horses, beef cattle, dairy cattle, sheep and swine, in which the students become familiar with the general points to be observed in judging livestock. One-fourth of this time is given to the study of dairy cattle presented by the Department of Dairy Husbandry. Text: Craig's *Judging Livestock*.

53. BREEDS AND BREEDING. Second year, first semester. Class work, two hours. Two semester credits. Prerequisite: Stock Judging. Mr. Aubel.

This course consists of the study of pure-bred horses, cattle, sheep and swine, and the methods practiced by the best breeders. It also embraces the study of the general principles of breeding, such as variation and heredity. Text: Mumford's *Breeding of Farm Animals*.

55. LIVESTOCK PRODUCTION. Second year, second semester. Class work, three hours. Three semester credits. Prerequisite: Elementary Chemistry II, and Breeds and Breeding. Mr. Gatewood.

This course involves the study of the comparison and usefulness of various feeds, and a study of successful and economical methods of growing and finishing cattle, sheep and hogs for market purposes, as well as the breeding of both market and pure-bred animals. Text: Woll's *Productive Feeding of Farm Animals*.

MILLING INDUSTRY

51. ELEMENTARY GRAIN MARKETING. Third year, first semester. Class work, two hours. Two semester credits. Professor Fitz.

In this course are studied methods of harvesting, handling and storing of grain, together with the marketing of surplus grain from the farm. This involves methods of selling or buying, shipping and grading grain; organization of grain-inspection departments, with their merits and defects; the principal grain markets, with receipts and shipments of grain consumed. The by-products resulting from manufacture of food products from grain will be studied with regard to their feeding value and comparative cost.

POULTRY

51. BEGINNING POULTRY. Second year, first semester. Recitation, one hour; laboratory, two hours. Two semester credits. Assistant Townsley.

This course takes up a discussion of the various operations that go to make up the art of poultry keeping.

Laboratory.—The laboratory study includes work in dressing, packing and caponizing.

52. ELEMENTS OF POULTRY KEEPING. Third year, first semester. Recitation, two hours. Two semester credits. Professor Lippincott and Assistant Townsley.

This course is the same as Beginning Poultry, except that no laboratory work is required.

VETERINARY MEDICINE

61. DISEASES OF FARM ANIMALS. Third year, first semester. Class work, two hours. Two semester credits. Doctor Elder.

This course is intended to teach the student the recognition of disease, the principles involved in the preservation of health, and the application of first aid in disease or accident of farm animals. The various diseases resulting from the use of spoiled foods or the improper or injudicious use of good foods are discussed. The value of food, care and the nursing of the sick animal is thoroughly impressed upon the student. The common infectious diseases and the means of their prevention and eradication are considered. Text: Craig's *Common Diseases of Farm Animals*.

General Science Courses

BACTERIOLOGY

51. AGRICULTURAL BACTERIOLOGY. Third year, second semester. Lectures, two hours; laboratory, two hours. Three semester credits. Prerequisite: Chemistry, one year. Mr. McClung.

An elementary course in the principles of bacteriology is here offered, taking up bacteriological problems from an entirely practical standpoint. The course is offered in order to give the student a reading knowledge of the sources and modes of infection; the relation of bacteriology to dairying and to soils and crop production; general sanitation; fermentations, etc.

Laboratory.—General laboratory manipulations; normal and abnormal fermentations of milk and milk products; quantitative study of bacteria in the soil; a limited study of fermentations, of pathogenic bacteria, of sewage pollution of water, etc., comprises the laboratory work.

61. HOUSEHOLD BACTERIOLOGY. Third year, first semester. Lectures, two hours; laboratory, two hours. Three semester credits. Prerequisite: Chemistry, one year. Mr. McClung.

This course includes a general survey of the sciences of bacteriology as applied to the home. It includes a discussion of microorganisms as related to air, water, foods, general sanitation, fermentations, etc. An attempt is made to present the subject in as simple a manner as possible. The course is offered in the hope of giving the student a general understanding of the fundamentals, and a reading knowledge of the science.

Laboratory.—Various microscopic forms of importance in fermentation; preservation and spoilage of foods; the influence of various preservatives upon microorganisms common in the home; methods of sterilization and of pasteurization; the handling of infectious material, etc., are the subjects taken up in the laboratory work.

BOTANY

51. ELEMENTARY BOTANY. First year, both semesters. Class work, two hours; laboratory, three hours. Three semester credits. Miss Kirkbride.

This course involves an elementary study of the biology of plants, including the simpler facts of their structure and of their physiology. The life history of a seed plant is followed from the germination of the seed to maturity; and the structure and work of the root, stem and leaf system is studied in some detail. The biology of the flower and its peculiar adaptations to insect or wind pollination is emphasized, as well as the manner in which seeds and fruits are distributed. Throughout the course emphasis is laid on the relations of plants to light, air, water and soil, and on the relation of the biology of the plants to agricultural practice.

CHEMISTRY

51. ELEMENTARY CHEMISTRY. Second year, first semester. Lectures and recitations, three hours; laboratory, two hours. Four semester credits. Mr. Gutsche.

The work this term is an elementary study of the general principles of chemistry, using the elements oxygen, hydrogen, nitrogen, chlorine and carbon, and their most important compounds, as its basis. Sulphur and

phosphorus, and to a slight extent other nonmetals, are studied, and following this a study of the metals and their most important compounds is begun. So far as possible, illustrations are drawn from practical life on the farm and in the home. The laboratory work is designed to give the student some knowledge of the essential features of chemical change, as well as to familiarize him with some of the more important elements and chemical compounds. Textbook: McPherson and Henderson's *First Course in Chemistry*.

52. ELEMENTARY HOUSEHOLD CHEMISTRY. Second year, second semester. Lectures and recitations, three hours; laboratory, two hours. Four semester credits. Prerequisite: Elementary Chemistry. Mr. Gutsche.

In the work of this term the study of the metals is completed and chemistry is then studied in its more direct application to the household. The course includes not only some special applications of inorganic chemistry, but simple organic chemistry, especially in its relation to foods. The laboratory work is an application of chemistry to various household problems touching water, foods, textiles, and utensils. Textbook: Snyder's *Chemistry of Plant and Animal Life*.

53. ELEMENTARY AGRICULTURAL CHEMISTRY. Second year, second semester. Lectures and recitations, three hours; laboratory, two hours. Four semester credits. Prerequisite: Elementary Chemistry. Mr. Gutsche.

The study of the metals, begun the previous semester, is first completed. The chemical composition and chemistry of the growth of plants and animals is then taken up, and the general principles of chemistry are presented as applicable on the farm in relation to soils, fertilizers, dairy products, feeds, water, etc. The laboratory work follows these lines and is made as practical as possible. Textbook: Snyder's *Chemistry of Plant and Animal Life*.

ECONOMICS

51. ECONOMICS. Second or third year, both semesters. Class work, three hours. Three semester credits. Assistant Professor Macklin.

This course is a study of fundamental principles underlying man's wealth-getting and wealth-using activities, and their application to conditions and problems of the industries of to-day. Instruction is based on a text, assigned readings, and reports.

52. RURAL ECONOMICS. Third year, both semesters. Class work, three hours. Three semester credits. Assistant Professor Macklin.

This course presents briefly the fundamental principles of economics as related to the farm. It deals with the factors of production and the organization of the farm, followed by the principles governing value and a survey of marketing problems. Coöperation and its place with reference to farm needs is treated. The aim of the course is to give a knowledge of the principles that should guide the farmer in his work. Instruction is imparted by lectures, assigned readings, and reports.

ENGLISH

51. ENGLISH I. First year, first semester. Class work, four hours. Four semester credits. Assistant Professor Rice, Miss Leonard, Mr. Page.

This course has a twofold purpose: to develop in the student the ability to interpret readily from the printed page, and to give instruction in the elementary principles of composition. For the first aim, short

selections from the readers are used with readings from text books, biographies, current periodicals, and works of a vocational nature. In connection with the text, practice work in letter writing and business forms is emphasized. Texts: Searson and Martin, *Studies*, Advanced Course; Hansen, *Two Years' Course in English Composition*.

54. ENGLISH II. First year, second semester. Class work, four hours. Four semester credits. Assistant Professor Rice, Miss Leonard, Mr. Page.

This course is a continuation of English I. It includes a review of grammar, practice in the use of the dictionary, and a thorough study of the paragraph. Oral composition is required. Emphasis is placed on the writing of themes on topics of keenest interest to the student. Text: Hansen, *Two Years' Course in English Composition*, chapters IX-XIII, inclusive.

61. ENGLISH III. Second year, first semester. Class work, four hours. Four semester credits. Assistant Professor Rice, Mr. Cooke, Mr. Page.

The work of this course consists of a study of American literature. Class readings, class discussions, written sketches, abstracts and outlines are required. The aim of the course is to familiarize the student with the masterpieces of his own countrymen, and to offer continued study in the cultural as well as the practical side of literature and language. Text: Cairns, *American Literature for Secondary Schools*, to page 147.

64. ENGLISH IV. Second year, second semester. Class work, four hours. Four credits. Assistant Professor Rice, Miss Maclean, Mr. Christoph.

This course is a continuation of the work in English III, completing the work of the text. Selections from the works of Poe, Webster, Lincoln, Longfellow, Whittier, Emerson, Lowell, Holmes and others are chosen for study, and some written work is required. Text: Cairns, *American Literature for Secondary Schools*, page 147 to end.

71. ENGLISH V. Third year, both semesters. Class work, three hours. Three semester credits. Assistant Professor Rice, Miss Syford, Mr. ———.

This is a course in advanced composition. It includes instruction in the four forms of discourse, practice in the preparation of original themes, oral English, elementary debating, and a continuation of first-year work in commercial usage. Texts: Hanson, *Two Years' Course in English Composition*, Part III; Davis and Lingham, *Business English and Correspondence*.

74. ENGLISH VI. Third year, second semester. Class work, four hours. Four semester credits. Assistant Professor Rice, Mr. Burk, Mr. Christoph.

This is a course in English classics. It includes an intensive study of representative classics. Abstracts, outlines, paraphrases and original themes are required. Texts: Selections from the works of Shakspeare, Scott, Burns, Tennyson, and others.

ENTOMOLOGY

51. HOUSEHOLD INSECTS. First year, first semester. Class work, two hours. Two semester credits. Prerequisite: General Biology. Professor Dean.

This course consists of illustrated lectures and reference reading on the habits, life history and general methods of control of the principal insects injurious to house, garden, lawn, and human health.

61. FARM INSECTS. Second year, second semester. Class work, two hours. Two semester credits. Prerequisite: General Biology. Associate Professor Welch.

This is a study of the elementary anatomy, structure and physiology of insects, complete enough to give a clear understanding of the general structure of insects and the underlying facts upon which the scientific application of remedial or preventive measures is based. All of the more important insects of the farm, garden, and orchard are discussed at sufficient length to give a clear idea of their life histories and habits, together with the best means of control. The class work consists of lectures and text.

HISTORY

51, 52. ANCIENT HISTORY I AND II. Third year, first and second semesters. Class work, four hours each term. Four semester credits each term. Miss Reynolds.

The history of civilization in the Nile and the Tigris-Euphrates valleys serves as an introduction to the more serious work of this course in which the emphasis is placed upon the history of Greece and Rome and Western Europe down to 800 A.D. In addition to the greater political events characterizing the history of these regions, special attention is given to the institutional life of this period, to the social, economic and intellectual forces at work in the different states as well as to their governmental organization. Text: Westermann's *The Story of the Ancient Nations*.

55, 56. MODERN HISTORY I AND II. Third year, first and second semesters. Class work, four hours each term. Four semester credits each term. Miss Reynolds.

Beginning with 800 A.D., a general survey is made of the development of Europe down to the present time and conditions. The more important events of the eleven centuries comprising this period are treated in as full detail as time will permit. The social, economic, cultural, religious, and diplomatic phases are emphasized. In view of the fact that greater changes have taken place in Europe since 1789 than in the thousand years preceding, special attention is given to the social and economic developments of this period and to the political developments and international relations, especially the changes which have prepared the way for the present European situation. Text: Harding's *New Medieval and Modern History*.

59, 60. AMERICAN HISTORY I AND II. Third year, first and second semesters. Class work, four hours each term. Four semester credits each term. Assistant Professor James.

This course consists of a survey of American history from the discovery of America to the present time. It deals with the establishment of the English colonies in America; the growth of social and political institutions in these colonies; the development of an American nationality; the struggle among European nations for the possession of North America; the causes and meaning of the American Revolution; the formation and establishment of the constitution; the rise of the West and its influence, socially, politically and economically; the growth of sectionalism, the secession movement and the struggle to preserve the Union; and the important events characterizing American history since the termination of the contest between the North and the South. Along with the political history of the United States, a study of its economic development is made for the purpose of understanding the steps by which America, from humble beginnings in the colonial period, has reached its present high position as an industrial state. Texts: West's *American History and Government*, and Bogart's *The Economic History of the United States*.

63. CIVICS. Third year, both semesters. Class work, four hours. Four semester credits. Assistant Professor James.

This is not a course of the old type, usually called civil government, nor a course in constitutional law, but a vigorous course in the actual workings of our present-day governmental and political activities. Text: Guiteau's *Government and Politics in the United States*, Kansas edition.

65. ELEMENTARY INDUSTRIAL HISTORY. Not offered 1917-'18. Class work, four hours. Four semester credits. Assistant Professor James.

This course is devoted to a study of American industrial life; how they have modified our history and government, and how in turn they have been modified by historical development and governmental regulations. The course is based primarily on the third edition of Bogart's *Economic History of the United States*.

INDUSTRIAL JOURNALISM AND PRINTING

51. FARM WRITING. Third year, second semester. Class work, two hours; laboratory, four hours. Four semester credits. Mr. Snow.

The course treats the elementary principles of writing for newspapers and farm publications, on such subjects as the students are likely to encounter in practical life. The student is shown how to obtain effective publicity for worthy enterprises in which he may be engaged. Emphasis is laid on agriculture, rural life, and general community service.

MATHEMATICS

51. INDUSTRIAL ARITHMETIC A. First year, first semester. Class work, four hours. Four semester credits. Assistant Professor Stratton and Mr. Fehn.

The course has two distinct aims: (1) A practical knowledge of the principles of numbers, both integral and fractional; (2) the application of these principles to practical problems of the farm and the shop. A large number of problems arising from actual experience over the whole field of agricultural science will be made the basis of the problem work. Farm investments, farm accounts and farm values will receive special attention. Text: Stratton and Remick's *Agricultural Arithmetic*.

52. INDUSTRIAL ARITHMETIC W. First year, first semester. Class work, four hours. Four semester credits. Miss Zeininger and Miss Holroyd.

This course follows the lines of Industrial Arithmetic A, except that the points of emphasis are varied so as to meet the needs of young women. Text: Same as for the course above.

55. APPLIED MATHEMATICS A. First year, second semester. Class work, four hours. Four semester credits. Assistant Professor Stratton and Miss Holroyd.

The course includes an introduction to the first principles of algebra and geometry; the use and meaning of symbols; simple problems in algebraic reckoning; the solution of simple equations of the first and second degrees; graphical solutions; geometrical constructions; illustration rather than proof of important geometrical theorems; computation of areas and volumes, with emphasis upon the problems arising from building and construction on the farm. Text: Breslich's *First Year Mathematics*.

56. APPLIED MATHEMATICS W. Second year, second semester. Class work, four hours. Four semester credits. Miss Zeininger.

This course presents work similar to that of Applied Mathematics A, with adaptations to the needs of young women. Text: Same as for course preceding.

61. ALGEBRA I. First year, first semester. Class work, four hours. Four semester credits. Miss Zeininger and Mr. Fehn.

This course includes a study of the four fundamental operations, integral linear equations, factoring, and fractions. Text: Hawkes, Luby and Touton's *First Course in Algebra*.

62. ALGEBRA II. First year, second semester. Class work, four hours. Four semester credits. Prerequisite: Algebra I. Assistant Professor Stratton and Miss Zeininger.

The subjects considered are: ratio and proportion, graphical representation, simultaneous linear equations, involution, evolution, theory of exponents, radicals, quadratic equations, and application to practical problems. Text: Hawkes, Luby and Touton's *First Course in Algebra*.

66. PLANE GEOMETRY I. Second year, first semester. Class work, four hours. Four semester credits. Prerequisite: Algebra II. Miss Zeininger and Miss Holroyd.

Books I and II of Wentworth and Smith's *Plane and Solid Geometry* are studied in this course.

67. PLANE GEOMETRY II. Second year, second semester. Class work, four hours. Four semester credits. Prerequisite: Plane Geometry I. Miss Zeininger and Mr. Fehn.

Books III, IV and V of Wentworth and Smith's *Plane and Solid Geometry* are included in this course.

71. SOLID GEOMETRY. Third year, first semester. Class work, four hours. Four semester credits. Prerequisite: Plane Geometry II. Miss Zeininger and Mr. Fehn and Miss Holroyd.

Books VI, VII and VIII of Wentworth and Smith's *Plane and Solid Geometry* form the subject matter of this course.

72. ALGEBRA III. Third year, second semester. Class work, four hours. Four semester credits. Prerequisite: Algebra II. Miss Zeininger, Mr. Fehn, and Miss Holroyd.

This course includes, besides a rapid review of factoring, fractions, linear equations, roots, radicals, and exponents, a treatment of quadratic forms with graphical work and theory, ratio and proportion, variation, the progressions, and the binomial theorem for positive integral exponents. Text: Hawkes, Luby and Touton's *Second Course in Algebra*.

MILITARY TRAINING

51. MILITARY SCIENCE I. First semester. Three hours. One credit.

All young men are required to take military training during the first year of their attendance in the school. In the open weather of the fall and spring drills are held on three consecutive hours on Monday. During inclement weather indoor drill and lectures and recitations fill the time required. Information as to the uniform worn and as to other matters in connection with military drill are given in another section of this catalogue, under the title "Military Training."

52. MILITARY SCIENCE II. Second semester. Three hours. One credit.

This course is a continuation of Military Science I.

MUSIC

Music is offered as an elective for both young women and young men. Instruction is furnished free to all regular students assigned to music classes, but for individual instruction a fee is charged. Further particulars are given in the article on "Music," elsewhere in this catalogue.

PHYSICAL EDUCATION

MEN'S DEPARTMENT

51. PHYSICAL TRAINING M-I. Both semesters. Three hours. One semester credit. Assistant Professor Bauer.

The course includes elementary free-hand calisthenics; elementary light hand apparatus, including wands, dumb-bells, etc.; elementary heavy apparatus work, and games. All work is graded in progressive order for each semester. Swimming is taught in the spring. A physical examination is made of each student when he enters. During the fall rugby football and soccer football are given. From the first of December to the end of the semester the work is in the gymnasium. Elementary calisthenics and Swedish movements, elementary apparatus, and games are taught.

52. PHYSICAL TRAINING M-II. Both semesters. Three hours. One credit.

This course is a continuation of Physical Training M-I. In the spring, as soon as weather conditions allow the work consists of baseball and track and field athletics.

60. HYGIENE AND SOCIAL PROBLEMS M. Both semesters. No credit. Attendance on this course is required of all men during one semester of their first year in the school.

Hygiene and social problems are discussed. This instruction gives an insight into the practical problems of daily healthful living from a personal point of view. Directions are given for avoiding the common ills of student life, and for maintaining the highest physical and mental condition while in the school, as well as for gaining the highest development of vital power and health for future duties.

WOMEN'S DEPARTMENT

75, 76. PHYSICAL TRAINING W-I AND W-II. First and second semesters, respectively. Three hours. One semester credit for each course. Miss Loring.

This is an introductory course. It includes corrective exercises, light apparatus work, folk dancing, games, and swimming. A physical examination is made of each young woman before she enters upon the work.

77, 78. PHYSICAL TRAINING W-III AND W-IV. First and second semesters. Three hours. One semester credit for each course. Miss Loring.

These courses are a continuation of Physical Training W-I and W-II. Fancy steps, Swedish gymnastics, games and swimming are taught in these courses.

80. HYGIENE AND SOCIAL PROBLEMS W. Both semesters. Lectures, one hour. No credit. Dean Van Zile.

In these lectures, in addition to hygiene as applied to individual health, the biological truths that lead to serious, respectful consideration of social and sex hygiene are presented. Attendance is required of all young women during one semester of their first year in the School of Agriculture.

PHYSIOLOGY

51. PHYSIOLOGY AND HYGIENE A. Second year, first semester. Class work, three hours. Three semester credits. Doctor Elder.

This course includes the study of the anatomical structure and physiological functions of the human body. It includes a careful consideration of such factors in the maintenance of health as fresh air, diet, sleep, bathing and exercise. Text: Conn and Buddington's *Advanced Physiology and Hygiene*.

52. PHYSIOLOGY AND HYGIENE H. Third year, second semester. Class work, four hours. Four semester credits. Doctor Elder.

This course includes the study of the anatomical structure and physiological functions of the human body. It includes a careful consideration of such factors in the maintenance of health as fresh air, diet, sleep, bathing and exercise. Text: Conn and Buddington's *Advanced Physiology and Hygiene*.

PHYSICS

51. PHYSICS A-I. Second or third year, both semesters. Class work, three hours; laboratory, two hours. Four semester credits. Prerequisite: Algebra II. Mr. Pielemeier, Mr. J. E. Smith, Mr. F. R. Smith.

The fundamental laws of mechanics, heat and sound are presented in this course. The application of principles to the common things of everyday life is emphasized. The laboratory work is based upon the work done in class, and is outlined in such a manner as to give the students special drill in exact measurements. Text: Black and Davis's *Practical Physics*.

52. PHYSICS A-II. Second or third year, both semesters. Class work, three hours; laboratory, two hours. Four semester credits. Prerequisite: Physics A-I. Mr. Pielemeier, Mr. J. E. Smith, Mr. F. R. Smith.

This course is a continuation of course A-I. The subjects of magnetism, electricity, and light are considered. An introductory study is made of the units used in measuring electrical energy, the principles involved in current distribution, the uses now being made of electricity, the ordinary phenomena of light, and of questions of modern illumination. Text: Black and Davis's *Practical Physics*.

61. PHYSICS H-I. Third year, both semesters. Class work, three hours; laboratory, two hours. Four semester credits. Prerequisite: Algebra III. Assistant Professor Floyd and Mr. Allee.

The work given in this course has a direct bearing on the principles of mechanics, sound and heat as they apply to the home. The laboratory work is especially adapted to this phase of the work. Text: Tower, Smith, and Turton's *Physics*.

62. PHYSICS H-II. Third year, both semesters. Class work, three hours; laboratory, two hours. Four semester credits. Prerequisite: Physics H-I. Assistant Professor Floyd and Mr. Allee.

This course is a continuation of Physics H-I. The fundamental principles and laws of electricity and light are presented in this course, with special applications of the use of electricity in the home. Laboratory work is based on the study of simple electrical appliances used in the home. Text: Tower, Smith, and Turton's *Physics*.

ZOOLOGY

51. ELEMENTARY ZOÖLOGY. First year, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Instructor Hersh.

This course deals with the natural history of animals. The two hours of class work are devoted to résumés of the field and laboratory work and to general matters of animal biology. The laboratory work consists of one three-hour period a week. This work is carried on for the most part out of doors. The ponds and streams, meadows and woodlands are visited and the animals studied in their relation to each other and to their environments. Numbers of animals are brought to the laboratory, where they are kept in vivaria, and such study is given them as is not permitted out in the field.

Mechanic Arts Courses

DRAWING

51. FREE-HAND AND OBJECT DRAWING. First year, first semester. Laboratory, six hours. Three semester credits. Mr. Smith.

The work of this course includes exercises in drawing simple figures illustrating the effects of geometrical arrangement and the laws of design; the principles of perspective are studied and illustrated by drawing from geometric solids and simple objects. Practice is given in sketching objects of the shops and out-of-doors. Special emphasis is given to free-hand lettering.

52. GEOMETRICAL DRAWING. First year, second semester. Laboratory, six hours. Three semester credits. Mr. Smith.

This course comprises the construction of perpendiculars, parallels, angles, polygons, ellipses, etc.; lettering; the use of the T-square, drawing board, and drawing instruments; the making of simple working drawings.

APPLIED MECHANICS

51. CONCRETE CONSTRUCTION I. Recitations. Both semesters. Lectures and recitations, one hour. One semester credit. Assistant Professor Wendt and Mr. Robert.

Instruction is given in the principles governing the selection and preparation of materials, the proper proportioning of materials for different conditions, the construction of forms, mixing and handling concrete, elementary reinforced concrete construction, finishing concrete surfaces, stucco and plaster work, and waterproofing and coloring concrete. A brief study is made of the application of these principles to the making of concrete foundations, building blocks and bricks, posts, sidewalks, floors, tanks, cisterns, silos and bridges and culverts. Text: Seaton's *Concrete Construction for Rural Communities*.

55. CONCRETE CONSTRUCTION I, LABORATORY. Both semesters. Laboratory work, two hours. One semester credit. Must accompany or follow Concrete Construction I (Ap. Mech. 51). Assistant Professor Wendt, Mr. Robert, and assistants.

Laboratory and field work is given in hand and machine mixing and handling of concrete, and in the construction of forms, for such objects as machine and building foundations, floors, sidewalks, fence posts and building blocks. Tests are made on concrete cylinders and beams to illustrate the effect of different methods of treatment on the strength and reliability of plain and reinforced concrete.

60. CONCRETE CONSTRUCTION II. Second year, first semester. Laboratory, six hours. Three semester credits. Prerequisites: Concrete Construction I, Laboratory (Ap. Mech. 55). Assistant Professor Wendt.

Field work is given in practical plain and reinforced concrete construction, with lectures on field methods of bending steel, of placing it and securing it in place, and of mixing and placing concrete, with special reference to building and bridge construction. Simple laboratory tests of steel, of concrete and of reinforced concrete beams are also included.

65. CONCRETE CONSTRUCTION III. Second year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Concrete Construction II (Ap. Mech. 60). Mr. Robert.

This course includes standard tests for fineness, specific gravity, soundness and strength of cement, for voids, uniformity coefficient and cleanness of sand and stone, and for the effect of variation of these factors on the strength of mortars and concretes.

70. STRENGTH OF MATERIALS. Second year, second semester. Class work, three hours. Three semester credits. Prerequisite: Concrete Construction I, Laboratory (Ap. Mech. 55). Mr. Robert.

The course embraces a study of the strength of beams, columns and other structural and machine elements, of wood, steel, concrete and other materials.

MECHANICAL DRAWING

75. SHOP DRAWING I, LECTURE. Second year, first semester. Lectures and recitations, one hour. One semester credit. Prerequisite: Geometrical Drawing. Geometry I (Math. 66) must accompany or precede this course. Assistant Professor Pearce and Mr. Robert.

A study is made of the selection, use and care of drawing instruments, lettering, orthographic, cabinet and isometric projections, and the development of surfaces. Text: French's *Engineering Drawing*.

80. SHOP DRAWING I. Second year, first semester. Drafting-room practice, four hours. Two semester credits. Must accompany the lecture (Ap. Mech. 75). Assistant Professor Pearce and Mr. Robert.

Practice is given in lettering, in the construction of orthographic and isometric projections of objects and in the development of surfaces. The following supplies are required: triangles, T-square, scale, pencils, pens, ink, erasers, thumb tacks, drawing paper, and a set of drawing instruments. Students are advised not to purchase these supplies until after consultation with the instructor. Text: French's *Engineering Drawing*.

85. SHOP DRAWING II, LECTURE. Second year, second semester. Lectures and recitations, one hour. One semester credit. Prerequisite: Shop Drawing I (Ap. Mech. 80). Assistant Professor Pearce and Mr. Robert.

A continuation of the preceding course, with the study of conventional methods of representation, working drawings, technical sketching, and methods of reproducing working drawings. Text: French's *Engineering Drawing*.

90. SHOP DRAWING II. Second year, second semester. Drafting-room practice, four hours. Two semester credits. Must accompany the lecture (Ap. Mech. 85). Assistant Professor Pearce and Mr. Robert.

Working drawings are made from plates during the first part of the semester. Later, free-hand sketches are made of simple machine parts, and working drawings are made from these sketches. Practice is given in making tracings and blue prints.

95. SHOP DRAWING III. Third year, second semester. Drafting-room practice, four hours. Two semester credits. Prerequisite: Shop Drawing II (Ap. Mech. 90). Assistant Professor Pearce and Mr. Robert.

Practice is given in making working drawings from free-hand sketches of machine parts, assembly drawings, and in designing simple machine parts by empirical methods.

ELECTRICITY

51. **ELECTRICITY I-S.** Third year, first semester. Class work, two hours. Two semester credits. Prerequisites: Physics II (Physics 52) and Geometry II (Math. 67). Mr. Biorkman.

This course embraces a study of wiring materials and electrical machinery; line work; illumination; open and concealed wiring; wiring in conduit and metal molding; installation and operation of both direct- and alternating-current motors, generators, lamps, and heating appliances.

55. **ELECTRICITY I-S, LABORATORY.** Third year, first semester. Laboratory, two hours. One semester credit. Must accompany Electricity I-S (Elect. Engr. 51). Mr. Biorkman.

The student is here given practice in the connecting of generators, instruments and storage batteries, which compose the small electric plants used in lighting of rural residences; in the inspection, testing and care of various types of storage batteries; in the connection of motors and starting resistances, for use on both the isolated direct-current plants and on alternating-current transmission lines. A study is also made of the different methods of wiring farmhouses and other buildings, and of the construction of outside pole lines connecting these various buildings.

FARM MACHINERY

51. **ELEMENTARY FARM MACHINERY.** First year, first semester. Class work, one hour; laboratory, two hours. Two semester credits. Instructor Wiseman.

In this course the student is taught the principles underlying the construction, operation and adjustment of the different types of farm machinery. Instruction is also given in fencing, rope work and belt splicing. Proper adjustment and operation of machines is taught in the laboratory and in the field.

SHOP WORK

51. **CARPENTRY I.** First year, both semesters. Laboratory, four hours. Two semester credits. Mr. Parker and Mr. Ball.

A course of exercises in constructive carpentry, which are so graded as to give the student the principles of general carpenter work, and training in the proper use of tools and in the reading of drawings and blue prints. Some work is given to bring out the principles of framing and building operations, and practice is given in the use of paints and varnishes as protective coverings for woodwork.

54. **CARPENTRY II.** Elective, both semesters. Laboratory, six hours. Three semester credits. Prerequisite: none. Mr. Parker and Mr. Ball.

Exercises in turning cylinders, cones, beads, convex and concave turning, and exercises that will involve the use of all the different turning tools, and turning between centers, on the face-plate and with hollow chucks. Some of the exercises are: tool handles, dumb-bells, rolling-pins, napkin rings, table legs, porch posts, ballusters, built-up and solid newel posts, columns and rosettes.

57. **CARPENTRY III.** Elective, both semesters. Laboratory, six hours. Three semester credits. Prerequisite: Carpentry I (Shop 51). Mr. Parker and Mr. Ball.

This course includes a combination of machine and hand work where the material is worked up on the machines and then fitted by hand. Some of the work consists of making plain and fancy casings, plate rails, picture moldings, picture frames, and simple pieces of furniture, which are stained, varnished or otherwise finished.

60. CARPENTRY IV. Elective, both semesters. Laboratory, four hours. Two semester credits. Prerequisite: Carpentry III (Shop 57). Mr. Parker and Mr. Ball.

This course consists of hand work with the rabbet, router, beading and matching planes, and with the dado, plow, and fillister in making window sashes and frames, doors and frames, grooved flooring, door jambs, and molding.

63. CARPENTRY V. Elective, both semesters. Laboratory, supplemented by lectures, four hours. Two semester credits. Prerequisite: Carpentry IV (Shop 60). Mr. Parker and Mr. Ball.

The fundamental factors to be taken into consideration in the construction of buildings, as selection of the building site, laying out and squaring the foundation, excavating, types of foundations, form building for concrete, anchoring, placing of the sills, joists, bridging and studding, and bracing, rafter cutting and fitting, are studied in this course. The laboratory work consists of exercises along the lines given above.

66. CARPENTRY H. First year, second semester. Laboratory, four hours. Two semester credits. For women only. Mr. Parker and Mr. Ball.

A practical course in woodwork, in which the student makes simple articles, the making of which gives the proper training in the use of tools, and familiarity with the different kinds of woods, stains, varnishes, and paints. Supplementary lectures are given along with the laboratory work in order to bring out the different points more clearly.

69. BLACKSMITHING I. First year, both semesters. Laboratory, four hours. Two semester credits. Mr. Lynch and Mr. Bundy.

This is a very practical course in the forging operations, such as drawing, upsetting, welding, bending, twisting and punching, together with instruction in the proper use and care of the fire and tools, and in handling the metals in the forge.

72. BLACKSMITHING II. First year, both semesters. Laboratory, four hours. Two semester credits. Prerequisite: Blacksmithing I (Shop 69). Mr. Lynch and Mr. Bundy.

This work consists of the making of such tools as punches, chisels, drills, scrapers, hammers, and other tools that are used in the trade.

75. BLACKSMITHING III. Elective, both semesters. Laboratory, supplemented by lectures, six hours. Three semester credits. Prerequisite: Blacksmithing II (Shop 72). Mr. Lynch and Mr. Bundy.

A practical course in the various forging operations, with practice both as a blacksmith and helper, including the planning and laying out of work with special provisions for duplicate parts. Forging and forming tools are made as the nature of the work requires. Lectures are given so that the principles underlying the different operations may be thoroughly understood.

78. BLACKSMITHING IV. Elective, both semesters. Laboratory, six hours. Three semester credits. Prerequisite: Blacksmithing III (Shop 75). Mr. Lynch and Mr. Bundy.

This course includes the theory of hardening, tempering and annealing, case- and pack-hardening; a study of the nature of the different grades of carbon tool steel; tool forging, including the proper manipulation of the various lathe, planer and shaper tools; forging and heat treating special and high-speed steels. Instruction is by lectures and demonstrations.

81. BLACKSMITHING V. Elective, both semesters. Laboratory, six hours. Three semester credits. Prerequisite: Blacksmithing IV (Shop 78). Mr. Lynch and Mr. Bundy.

General shop work is here given, in which emphasis is laid on the quantity as well as the quality of the work, the idea being to give the student a knowledge of the amount of time required to do certain work. The work is varied so that the knowledge acquired will be as complete as possible.

84. BLACKSMITHING VI. Elective, both semesters. Laboratory, six hours. Three semester credits. Prerequisite: Blacksmithing V (Shop 81). Mr. Lynch and Mr. Bundy.

This is a continuation of Blacksmithing V, with practice with the oxacetylene and thermit processes of welding.

87. MACHINE SHOP I. Second year, both semesters. Laboratory, six hours. Three semester credits. Mr. Jones, Mr. Yost, and Mr. Dawson.

Practical machine work in the building and assembling of gas engines and wood lathes. Exercises are given to bring into use the various machines in the shops.

90. MACHINE SHOP II. Elective, both semesters. Laboratory, four hours. Two semester credits. Prerequisite: Machine Shop I (Shop 87). Mr. Jones, Mr. Yost, and Mr. Dawson.

This course embraces practical work in making repairs on machinery, such as babbitting and fitting bearings, aligning shaftings and pulleys, lacing and fitting belts, and general repair work on engines and other machinery.

93. MACHINE SHOP III. Elective, both semesters. Laboratory, six hours. Three semester credits. Prerequisite: Machine Shop II (Shop 90). Mr. Jones, Mr. Yost, and Mr. Dawson.

A continuation of the preceding term's work, with work on the milling machines and universal grinder.

96. MOLDING I. First year, both semesters. Laboratory, four hours. Two semester credits. Mr. Grant.

This course consists of floor and bench molding with a great variety of patterns, along with which the student gets experience with different kinds of sand and facings; also, open sand work, sweep molding, machine molding, core making, setting of cores, gates and risers, and different methods of venting.

STEAM AND GAS ENGINES

51, 54. GAS ENGINES I. First year, both semesters. Class work, one hour; laboratory, two hours. Two semester credits. Mr. Collins, Mr. Knickerbocker, and assistants.

A study of gasoline and kerosene engines; four-stroke and two-stroke cycle engines, gas-engine fuels, carburetors, ignition systems, lubrication, governing; selection, erection and operation of stationary gasoline and kerosene engines; fundamental parts of automobiles.

57. GAS ENGINES II. Elective, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Gas Engines I (Steam and Gas 51, 54). Mr. Collins, Mr. Knickerbocker, and assistants.

A detailed study of gas-engine operation and care, with special attention to ignition systems, carburetors and testing. Automobile parts, including engines, differentials, transmissions, lubricating systems, clutches, systems of ignition, starters and carburetors; tests of ignition equipment and carburetors.

60. GAS ENGINES III. Elective, first semester. Laboratory, six hours. Three semester credits. Prerequisite: Gas Engines II (Steam and Gas 57). Mr. Collins, and assistants.

The operation, repairs and testing of gas and oil engines.

63. GAS ENGINES IV. Elective, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Gas Engines III (Steam and Gas 60). Mr. Collins, and assistants.

A continuation of Gas Engines III, including gas producers and special tests.

66. TRACTOR ENGINES I. First year, both semesters. Laboratory, four hours. Two semester credits. Prerequisite: Gas Engines I (Steam and Gas 51, 54). Mr. Sanders, Mr. Buck, and assistants.

A study of gas traction engines, including motors, frames, transmission systems, cooling systems, ignition systems, lubricating systems, and carburetors; operation, care, repair and testing of gas traction engines.

69. TRACTION ENGINES II. Elective, first semester. Laboratory, four hours. Two semester credits. Prerequisite: Traction Engines I (Steam and Gas 66). Mr. Sanders, Mr. Buck, and assistants.

Operation, care and testing of various types of gasoline and kerosene traction engines, including belt tests, road tests and field tests.

72. TRACTION ENGINES III. Elective, second semester. Laboratory, four hours. Two semester credits. Prerequisite: Traction Engines II (Steam and Gas 69). Mr. Sanders, Mr. Collins, Mr. Buck.

A continuation of Traction Engines II, including special tests on gas traction engines.

75, 78. STEAM ENGINES AND BOILERS I. Elective, first semester. Class work, one hour; laboratory, four hours. Three semester credits. Mr. Collins and assistants.

The principal parts of a steam-power plant are considered, including fire-tube and water-tube boilers, boiler auxiliaries, piping for boilers, feed-water heaters, firing, and the fundamental details of steam engines. The selection, operation and management of steam engines and boilers and the fundamental parts of the steam traction engine are also considered in this course.

81. STEAM ENGINES AND BOILERS II. Elective, first semester. Laboratory, four hours. Two semester credits. Prerequisite: Steam Engines and Boilers I (Steam and Gas 75, 78). Mr. Collins and assistants.

This course includes operation, care, repair and testing of stationary traction steam engines.

Home Economics Courses

DOMESTIC ART

51. SEWING I. First year, first semester. Laboratory, four hours. Two semester credits. Miss French.

The purpose of this course is to give an intelligent knowledge of, and development of skill in the use of textiles as related to clothing. The fundamental stitches are applied in making a laundry bag. Study is made of the economy of mending, with practice on the various weaves and fabrics. The use of the sewing machine is learned in making a kitchen apron. The work in elementary design is correlated with this course by the application of original cross-stitch designs in color suitable to Christmas gifts. A notebook is required.

52. SEWING II. First year, second semester. Laboratory, four hours. Two semester credits. Prerequisite: Sewing I. Miss French.

This course includes a study of general factory conditions; purpose and work of the Consumer's League and child-labor laws as they tend to affect and control the manufacture and sale of factory-made garments.

Special attention is given to the selection of materials and trimmings suitable for underwear, with a brief history of lace and embroidery. Patterns are drafted and the following garments constructed: kimono, combination suit, petticoat, fancy corset cover, and chemise. A notebook is required.

53. SEWING III. Second year, first semester. Laboratory, four hours. Two semester credits. Prerequisite: Sewing II. Miss French.

A special study is given in this course to appropriate dress as expressed in the selection of designs, material and color of the costume for the individual. Patterns are drafted, alterations made, and the following garments completed: tailored wash skirt, tailored waist, fancy lingerie waist, and a simple cotton dress suitable for evening wear.

61. DRESS DESIGN AND ART NEEDLEWORK. Second year, first semester. Laboratory, four hours. Two semester credits. Prerequisite: Elementary Design. Miss Hunt.

First nine weeks of the course comprises the study of design, of color harmony and its application to costumes and embroidery, and the making of costumes in pencil and water color. The last nine weeks of the semester the course includes the following stitches in crochet, knitting, cross-stitch, French embroidery, Roman cut work, and their application to undergarments, waists, collars, and household articles.

54. SEWING IV. Second year, second semester. Laboratory, four hours. Two semester credits. Prerequisite: Sewing III and Dress Design. Miss French.

This course offers a study of commercial patterns, woolen materials, and the conditions governing the price, selection, and wearing qualities of ready-made garments. A simple woolen dress, a tailored wool skirt and a silk blouse are completed.

55. SEWING V. Third year, first semester. Laboratory, four hours. Two semester credits. Prerequisites: Sewing I, II, III, IV, and Dress Design. Miss French.

This course emphasizes art in relation to dress; includes practices in cutting, fitting, finishing, and draping of such materials as silks, satins, chiffons, and laces.

62. ELEMENTARY TEXTILES AND MILLINERY. Third year, second semester. Laboratory, four hours. Two semester credits. Miss Fecht.

The first nine weeks of the course consists of the history and manufacture of textiles, the development of spinning and weaving, classifications and study of fibers, and practical tests for adulterations. The last nine weeks of the semester includes a study of the practical and artistic principles of millinery; practice in making bows, rosettes and other forms of hat decoration; the use of velvet, silk and straw, and a brief study of the manufacturing conditions.

DOMESTIC SCIENCE

51. COOKING I. First year, first semester. Recitation, one hour; laboratory, four hours. Three semester credits. Miss Perry.

Carbohydrates and protein foods are studied; their source, composition, manufacture and dietetic value are considered. The laboratory work includes practice in cooking fruits, vegetables, cereals, sugar, milk, and eggs. Six simple meals are served to members of the class that they may receive instruction in acting as hostess, host, and waitress.

52. COOKING II. First year, second semester. Recitation, one hour; laboratory, four hours. Three semester credits. Prerequisite: Cooking I. Miss Perry.

The study of protein food is continued as outlined above, followed by work with various leavening agents. The first part of the semester is devoted to the cooking of legumes and meats, with some work in frying and pastry making. The rest of the semester is devoted to practice in the use of various leavening agents, with emphasis on bread baking. Some special desserts are also studied. Meals are served as in Cooking I.

53. COOKING III. Second year, first semester. Laboratory, four hours. Two semester credits. Prerequisite: Cooking I. Miss Perry.

One-half of the semester is devoted to a study of the principles underlying the preservation of foods, with practice in canning, preserving, and pickling. The latter half of the course is spent in studying foods adapted to certain menus, and developing them into meals which are served in the class.

54. COOKING IV. Second year, second semester. Laboratory, four hours. Two semester credits. Prerequisite: Cooking III. Miss Perry.

The first of the semester's work is a continuation of Cooking III, with special emphasis given to planning and serving of typical farm menus for all occasions. In the second half of the semester practice is given in planning and serving food for large numbers.

61. GENERAL HOUSEKEEPING I. First year, first semester. Recitation, three hours. Three semester credits. Miss Kennedy and Miss Bartholomew.

Location, heating, lighting and ventilation of the home; rural and municipal water supply and sewage disposal; sanitation of foods; the transmission and prevention of disease; home care of the sick are studied in this course. Text: *The People's Health*, by Walter Moore Coleman, amplified by class discussions of outside readings.

62. GENERAL HOUSEKEEPING II. First year, second semester. Recitation, three hours. Three semester credits. Miss Bartholomew.

This course includes arrangement and furnishing of the home; buying of supplies, keeping of accounts; planning of household work in relation to efficiency; cleaning; laundering; care of walls and floors. Notebook work is required, together with outside readings.

HOME ART

51. ELEMENTARY DESIGN. First year, second semester. Laboratory, six hours. Three semester credits.

The principles underlying pleasing color combinations, fine proportions, and consistent arrangement of parts are studied. Many exercises are given in selecting from objects of clothing and house furnishings those involving color harmonies, consistent shapes, and orderly arrangement. Original problems are given in the application of these principles.

55. ELEMENTARY HOME DECORATION. Second year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Elementary Design.

Design principles of color, form and arrangement are studied in application to all problems involved in home decoration, such as window, door and wall spacings, woodwork, wall coverings and floor coverings; appropriate furniture, and the arrangement of these in different rooms.

Division of Agriculture.

WILLIAM M. JARDINE, *Dean*

The teaching of a rational, practical system of agriculture is fundamental to industrial development in a State whose principal resources are derived from agricultural pursuits. This State has permanent prosperity in direct proportion to the producing capacity of her land. The unit of production is the acre, and the most successful farmer is necessarily the one who can produce, at minimum cost, a maximum quantity of the best quality of agricultural products to the acre.

In order to do this it is necessary to know something of the soil, the conservation of its fertility and moisture, and its proper cultivation; the kinds of plants to grow and how to improve them; the selection, breeding, and feeding of livestock; the maintenance of orchards, gardens, and attractive surroundings; farm buildings, and the equipment of the farm home with modern conveniences; the best methods of marketing the products of the farm; and, in addition to all this, the making of the farm home the center of influence for good citizenship and fellowship in the neighborhood.

A man may get many of these things through practical experience, and thus become an exponent of modern farming, but the cost entailed is usually unnecessarily great. The Agricultural College furnishes a means of acquiring a systematic and practical training in agriculture, which fits young men adequately for the farm, at a minimum of time and financial cost.

EQUIPMENT

The facilities for such training in this College are of the best. The College owns 748 acres of land, which is used for instruction and demonstration in the various courses in agriculture and allied branches. By a recent appropriation \$80,000 is now available for the purchase of additional land. The campus, which comprises 160 acres, affords one of the best examples of ornamental tree planting and forestry in the State. Students working daily amid such surroundings can scarcely fail to gain an appreciation of and love for the beautiful. A tract of 320 acres is devoted to the work in agronomy. For horticultural and forestry work, eighty acres are used; for dairy work, about seventy acres; and for animal husbandry purposes, 140 acres. The herds and flocks contain all the important breeds of dairy and beef cattle, hogs, horses, and sheep, many animals of which have won championships at local and state fairs in the past five years. With this class of stock available for the work in judging the student is supplied with types of the best breeds, and becomes familiar with these types by actual handling of the stock.

The College has one of the best-equipped schools of veterinary medicine in the West. It is rated in class "A" by the United States Department of Agriculture, which rating places it among the best in the United States and Canada. In addition to giving the student the best possible

technical training in veterinary medicine, the course is designed to give the broad culture necessary for men who are to take their place in social and public affairs. Professional men, such as veterinarians, are placed in a more or less public relation to the community they serve. They must have a broad groundwork in cultural and ethical training, which will win them the confidence and respect of their communities. Success is measured in something more than dollars and cents, and the man whose view of life is no broader than his profession adds but little to the world and its happiness. The training given by the College in veterinary science, as in all its courses in agriculture, seeks to emphasize the value of the man as a man, as much as his value as a specialist in agriculture.

CURRICULA IN AGRICULTURE

The various needs of the student of agriculture are met by the following curricula:

- A six-year curriculum in animal husbandry and veterinary medicine.
- A four-year curriculum in agriculture.
- A four-year curriculum in veterinary medicine.
- A two-year short winter course in agriculture.
- A one-year creamery short course.
- A short course in testing dairy products.

DEGREES AND CERTIFICATES

The four-year curriculum in agriculture leads to the degree of bachelor of science in agriculture. The four-year curriculum in veterinary medicine leads to the degree of doctor of veterinary medicine. A short-course certificate is granted to a student completing the two-year short course in agriculture.

The four-year curriculum in agriculture is designed to meet the needs primarily of the students who expect to return to the farm. However, the student who completes the course will have had sufficient training to enable him to enter some one of the many lines of agricultural industry as a specialist. The demand for men thus trained is constantly increasing, and such positions offer attractive opportunities for men who by nature and training are adapted to the work. The United States Department of Agriculture, the state colleges and departments of agriculture, high schools, private institutions of secondary and college rank, and a great variety of commercial interests, are constantly demanding men trained in agriculture.

The young man who expects to make farming his life work can start with no better asset than the thorough training in practical and scientific agriculture afforded by the four-year curriculum. The American farmer needs more of the skill that comes through the training of the hand, in order that he may better do the work of farming; but infinitely more, he needs the training of the mind in the fundamental truths that lie back of every operation in farming, in order that he may use the skill of the craftsman with reason and judgment. One may learn to plow a field with the greatest skill; the work may be a model of its kind. If, however, it is plowed with utter disregard of the moisture conditions which prevail the result may be a failure. To understand the conditions

which should determine when and how to plow is the work of the trained mind; the other is the work of the trained hand. The farmer and the teacher in farming must possess both kinds of training, and the courses of study have been revised with this fact in view, and have been so arranged that *the student begins his practical training in agriculture on the first day he enters College, and continues it throughout the course.*

STATE TEACHERS' CERTIFICATES

By the selection of proper electives in the department of education, the four-year curriculum in agriculture may not only lead to the degree of bachelor of science in agriculture, but at the same time qualify the student for the three-year Kansas state teachers' certificate, renewable for life and valid in any high school or any other public school in the state. A student desiring to qualify for teaching should begin his professional preparation by electing psychology, first semester, junior year. A total of eighteen semester credits in the department of education is required for this certificate. These must include the following courses: psychology, educational administration, history of education and educational psychology.

THE CURRICULUM IN AGRICULTURE

One hundred thirty-two semester credits in addition to military science are required for graduates, as follows:

	Semester credits	
Prescribed agriculture	42	
Electives in agriculture, required with their prerequisites...	22	
Required in agriculture.....		64
Prescribed in nonagriculture.....	46	
Electives in nonagriculture, required.....	6	
Electives that may be nonagriculture.....	16	
Total allowed in nonagriculture.....		68
Required in military science.....		4
Total semester credits for graduation.....		136

As shown in the above general outline and in the tabulated curriculum given hereafter, the candidate for graduation must have completed one hundred thirty-six College semester credits. The twelve major electives required must be taken from some one of the departments of the division of agriculture. The ten minor electives must support the major work. They may be taken from more than one department, and may even be selected from departments in other divisions of the College, but they must directly strengthen the student's preparation in agriculture. At the discretion of the student, twenty-two elective credits may be nonagricultural. However, six semester credits of the junior electives and the ten senior semester credits, designated "free electives," may be earned in College credit courses and may be chosen without restriction.

The student who completes the freshman and sophomore years will have had, in addition to the fundamental work in chemistry, zoölogy, botany, English, and physics, practical studies in the physiology of plants and plant diseases, farm crops, livestock, dairying, poultry, and horticulture. These two years give the student a general knowledge of the whole range of practical agriculture. More than one-third of his time in these freshman and sophomore years being devoted to practical agricultural subjects.

During the junior and senior years the student continues his studies of fundamental science and learns to apply science to practical agriculture. He is led step by step to understand the scientific relation of every farming operation. There is so much agriculture to be taught that it becomes necessary for the student to choose in which of the general lines he will find that which best suits his needs or liking. This is made possible by numerous electives in soils, crops, animal husbandry, veterinary medicine, dairy husbandry, horticulture, milling, and poultry.

The foundation of all agricultural work is the soil and the crops grown upon it. Success in livestock or dairying depends, in a great measure, upon the ability of the soil to produce, with economy, sufficient crops of the right character. Success in grain farming depends wholly on the productiveness of the soil and the selection of the crops and of methods of culture adapted to the region under cultivation.

THE CURRICULUM IN VETERINARY MEDICINE

Veterinary medicine has made remarkable advances within recent years, and is taking its place alongside human medicine as a science. In truth, medical science and veterinary science are but specialized branches of the same science, and must be developed together. The modern veterinarian takes his place in the community as a professional man of education and culture. With the general improvement of the livestock on the farms, and with the advance of livestock in value, there is constant increase in the demand for skilled physicians to care for them.

The veterinarian, while primarily trained to conserve the health of farm animals, has a yet larger service to render in preventing diseases common to both man and beast from being communicated from domestic animals to man. Moreover, he must see that the animals slaughtered for meat are healthy and that the products are handled under such conditions as to render them suitable for human food. The public is now demanding that milk and other food products be free from contamination and that they be incapable of transmitting dangerous diseases, like tuberculosis, typhoid fever, scarlet fever, and diphtheria. There is ample work for all of the thoroughly competent veterinarians that the colleges of the country will train.

The course in veterinary medicine at the Agricultural College was established to give the young men of this State an opportunity to pursue these studies in an agricultural environment, where the facilities offered by other branches of the College would be at their command. While the instruction in this course is largely technical, enough subjects of a general character are included to give a sound education and a broad outlook. Better to fit the veterinarian to deal wisely with the livestock problems which he has to meet, he is required to take the work in stock feeding, stock breeding, stock judging, milk inspection, zoölogy, and embryology, in addition to his purely professional work.

The diploma from this school is recognized by the United States Department of Agriculture, by the United States Civil Service Commission, by the American Veterinary Medical Association, and by the various examining boards of the several states and territories of America where it has been presented.

CURRICULUM IN ANIMAL HUSBANDRY AND VETERINARY MEDICINE

The combined curriculum in animal husbandry and veterinary medicine has been outlined so that students may receive the degree of bachelor of science in agriculture at the end of four years, and the degree of doctor of veterinary medicine at the end of two years more, thus securing both degrees in six years.

Curriculum in Agriculture

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER.
College Rhetoric I	College Rhetoric II
Engl. 101 3(3-0)	Engl. 104 3(3-0)
Composition and Literature I	Composition and Literature II
Engl. 151 2(2-0)	Engl. 154 2(2-0)
Chemistry I	Chemistry II
Chem. 101 5(3-4, 2)	Chem. 102 5(3-4, 2)
General Botany	Plant Physiology I
Bot. 101 3(1-4, 2)	Bot. 104 3(1-4, 2)
Types and Classes of Live Stock	Plant Propagation
An. Husb. 101..... 3(1-6)	Hort. 101 3(2-3, 1)
Library Methods	Dairy Judging
Lib. Ec. 101..... 1(1-0)	Dairy Husb. 1(0-3)
Military Science I	Military Science II
Mil. Tr. 101..... 1(0-3)	Mil. Tr. 102..... 1(0-3)
Hygiene and Social Problems M	
Phys. Ed. 125..... R	

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER.
Organic Chemistry	Quantitative Analysis I
Chem. 120 3(2-2, 1)	Chem. 150 2(0-6)
Elements of Dairying	Agricultural Physics
Dairy Husb. 101..... 3(2-3)	Physics 111 3(3-0)
Anatomy and Physiology	General Zoology
Vet. 205 5(3-6)	Zool. 105 5(3-6)
Grain Crop Production	Forage Crop Production
Agron. 101 3(2-2, 1)	Agron. 102 3(2-2, 1)
Plant Pathology I	Farm Poultry Production
Bot. 107 3(1-4, 2)	Poult. Husb. 101..... 2(1-2, 1)
Military Science III	Orcharding
Mil. Tr. 108..... 1(0-3)	Hort. 107 2(1-2, 1)
	Military Science IV
	Mil. Tr. 104..... 1(0-3)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER.
Principles of Feeding	Principles of Breeding
An. Husb. 104..... 3(3-0)	An. Husb. 106..... 3(3-0) or
Soils	Plant Breeding
Agron. 181 4(3-3)	Bot. 205 3(1-4, 2)
Agricultural Microbiology	Soil Fertility
Bact. 106 3(1-6)	Agron. 182 3(2-2, 1)
Electives * 6	Agricultural Journalism
	Ind. Jour. 121..... 1(1-0)
	General Entomology
	Ent. 101 3(2-3)
	Electives 6

* Six semester credit hours of junior electives must be chosen from the work offered in history, economics, education, modern languages, or mathematics. Students preparing to teach should take not less than eight of these twelve semester credit hours of junior electives in the Department of Education.

CURRICULUM IN AGRICULTURE—Continued

SENIOR

FIRST SEMESTER		SECOND SEMESTER	
Major electives †	6	Major electives	6
Minor electives ‡	5	Minor electives	5
Free electives §	5	Free electives	5

*Agricultural Electives for Students in the Curriculum
in Agriculture*

AGRONOMY

FIRST SEMESTER		SECOND SEMESTER	
Advanced Grain Crops	2(1-3)	Advanced Forage Crops	2(1-3)
		Crop Improvement	3(2-3)
Advanced Soil Fertility	2(1-3)	Special Crops	1(1-0)
		Dry-land Farming	3(2-3)
Soil Management	2(1-3)	Soil Survey	2(1-3)
Principles of Agronomic Experimentation	1(1-0)	Agronomic Seminar	1(1-0)
Cost Accounting	2(1-3)	Advanced Farm Management	2(1-3)
		Farm Management	3(2-3)
		(Each semester)	
		Crops Research	(1 to 5 semester credits)
		(Each semester and Summer School, for graduates)	
		Soils Research	(1 to 5 semester credits)
		(Each semester and Summer School, for graduates)	
		Farm Management Research	(1 to 5 semester credits)
		(Each semester and Summer School, for graduates)	

ADAPTATION CURRICULA FOR CLASSES OF 1918, 1919, AND 1920

The class of 1920 will be required to complete the sophomore, junior and senior years as provided in this curriculum, except that Qualitative Analysis (3 credits) is to take the place of Plant Pathology, first semester, sophomore year; and Library Methods is to be added to the work of the first or of the second semester, sophomore year. Free electives must include at least two semester credit hours in the Department of English.

The class of 1919 will be required to complete the junior and senior years as provided in this curriculum, except that Farm Poultry Production and either Agricultural Chemistry or Quantitative Analysis (2 credits) are to take the place of Principles of Feeding, first semester, junior year. (This will make a total of 17 credits required for this semester's work.) Free electives must include at least two credit hours in the English Department.

The class of 1918 will be held for the senior year as provided in this curriculum, except that at least two credit hours of free electives must be in the English Department.

† Major electives must be chosen from one department in the Division of Agriculture, and approved by the head of that department.

‡ Minor electives may be chosen from more than one department. They must be agricultural subjects, or closely related science, and support the major work.

§ Students preparing to teach must use senior free electives in completing their requirements for the state teachers' certificate.

Agricultural Electives—continued

ANIMAL HUSBANDRY

FIRST SEMESTER	SECOND SEMESTER
History of Breeds and Pedigrees 3(2-3)	Pork Production 2(2-0)
Mutton Production 2(2-0)	Beef Production 2(2-0)
Advanced Stock Judging I 2(0-6)	Advanced Stock Judging II 2(0-6)
Form and Function in Farm Animals 2(0-6)	Horse Production 2(2-0)
Livestock Marketing 2(2-0)	Advanced Feeding 2(2-0)
Animal Genetics 2(1-3)	Animal Husbandry Seminar 2(2-0)
	Advanced Animal Genetics 2(1-3)
	Livestock Management 3(1-6)
	(Each semester)
	Meats 2(1-3)
	(Each semester)
	Teachers' Course in Animal Husbandry (2 semester credits, Summer School)

DAIRY HUSBANDRY

FIRST SEMESTER	SECOND SEMESTER
Butter Making and Creamery Management 3(2-3)	Dairy Inspection I 2(1-3)
Market Milk 2(1-3)	Milk Production 3(3-0)
	Cheese and Ice Cream Making 3(2-3)
	Advanced Dairy Judging 1(0-3)
	Dairy Seminar 1(1-0)
	Dairy Research (3 semester credits)
	(Each semester, for graduates)

HORTICULTURE

FIRST SEMESTER	SECOND SEMESTER
Systematic Pomology 3(1-6)	Small Fruits 2(2-0)
Farm Forestry 4(3-3)	Dendrology 3(1-6)
Practical Pomology 3(2-3)	Silviculture 3(2-3)
Spraying 2(1-3)	Orchard Management 4(2-3)
	Market Gardening 3(2-3)
	Landscape Gardening I 4(2-6)
	(Also given in Summer School)
	School Gardening 3(2-3)
Greenhouse Construction and Management 3(3-0)	Plant Materials of Landscape Gardening 3(2-3)
History and Literature of Landscape Gardening 2(2-0)	Landscape Gardening II 3(0-9)
The Theory and Aesthetics of Landscape Gardening 3(2-3)	Tree Surgery 2(1-3)
	City and Town Planning 3(1-6)

Electives—continued

MILLING INDUSTRY

FIRST SEMESTER	SECOND SEMESTER
Grain Marketing 3(3-0)	Principles of Milling 1(0-3)
	Grain Products 2(2-0)
	Milling Practice I 3(1-6)
Wheat and Flour Testing 4(1-9)	Milling Practice II 2(0-6)
	Experimental Baking A 2(0-6)

POULTRY HUSBANDRY

FIRST SEMESTER	SECOND SEMESTER
Practice in Poultry Feeding (1 semester credit)	Practice in Incubation (1 or 2 semester credits) (Also given in Summer School)
	Practice in Brooding (1 to 3 semester credits) (Also given in Summer School)
Practice in Milk Feeding (1 semester credit)	Advanced Poultry Judging 1(0-3)
Poultry Breeds and Types 2(1-3) (Also given in Summer School)	Poultry Breeding 2(0-6)
Market Poultry 2(1-3) or 3(1-6) (Also given in Summer School)	Poultry Farm Management 2(1-3)
	Poultry Bacteriology 3(1-6)
	Comparative Anatomy of Domestic Birds 3(1-6) (Given 1918-'19)
Poultry Research (2 to 4 semester credits)	

VETERINARY MEDICINE

FIRST SEMESTER	SECOND SEMESTER
Anatomy I 6(3-9)	Anatomy II 7(3-12)
Anatomy III 5(1-12)	Anatomy IV 3(1-6)
Histology I 3(1-6)	Histology II 3(1-6)
	Farm Animals in Health and Disease 3(2-3) (Also given in the Summer School)
	Obstetrics 3(3-0)
	Horseshoeing 1(1-0)
	Experimental and Practical Physiology 3(1-6)

*Electives—continued***List of Electives for Agricultural Students, With Their Prerequisites**

<i>Subject</i>	<i>Prerequisites</i>
AGRONOMY:	
Advanced Grain Crops.....	Grain Crop Production
Advanced Forage Crops.....	Forage Crop Production
Crop Improvement	Grain Crop Production
Special Crops	Grain Crop Production, and Forage Crop Production
Dry-land Farming	Soils
Soil Survey	Soils
Advanced Soil Fertility.....	Soil Fertility
Soil Management	Soil Fertility
Cost Accounting	None
Principles of Agronomic Experimentation, Farm Management	Crop Improvement, and Soil Fertility
Advanced Farm Management.....	Grain Crop Production, Forage Crop Production, and Principles of Feeding
Crops Research	Farm Management
Soils Research	General Botany, and Crop Improvement
Farm Management Research.....	Soil Fertility, and Elementary Organic Chemistry
ANIMAL HUSBANDRY:	
History of Breeds and Pedigrees.....	Farm Management
Livestock Management	Types and Classes of Livestock
Pork Production	Principles of Feeding
Mutton Production	Principles of Feeding
Beef Production	Principles of Feeding
Horse Production	Principles of Feeding
Meats	Principles of Feeding, Principles of Breeding
Advanced Stock Judging I.....	Types and Classes of Livestock
Advanced Stock Judging II.....	Advanced Stock Judging I
Form and Function in Farm Animals....	Advanced Stock Judging II
Teachers' Course in Animal Husbandry, Advanced Feeding	None
Livestock Marketing	Principles of Feeding
Animal Husbandry Seminar.....	Agricultural Economics, and Cooperation and Marketing
Animal Genetics	History of Breeds and Pedigrees
Advanced Animal Genetics.....	Principles of Breeding and General Embryology
APPLIED MECHANICS:	
Concrete Construction	Animal Genetics
Mechanical Drawing I.....	None
ARCHITECTURE:	
General Drawing I.....	General Drawing I
Rural Architecture	None
Landscape Design	None
BACTERIOLOGY:	
Soil Microbiology	None
Dairy Bacteriology	Agricultural Microbiology
Poultry Bacteriology	Agricultural Microbiology
BOTANY:	
Plant Physiology II.....	Agricultural Microbiology
Plant Genetics I.....	Plant Physiology I
Plant Genetics II.....	Plant Breeding
Plant Genetics III.....	Plant Genetics I
Economic Botany	Plant Genetics II
Plant Pathology II.....	General Botany
Plant Pathology III.....	Plant Pathology I
CHEMISTRY:	
Advanced Inorganic Chemistry.....	Plant Pathology II
Inorganic Preparations	Chemistry II
Organic Chemistry I.....	Chemistry II
Organic Chemistry II.....	Chemistry II
Principles of Animal Nutrition.....	Organic Chemistry I
Physiological Chemistry	Organic Chemistry
Quantitative Analysis II.....	Organic Chemistry
Quantitative Analysis III.....	Quantitative Analysis I
Chemistry of Soils and Fertilizers.....	Quantitative Analysis II
Chemistry of Plant Products.....	Quantitative Analysis I
Chemistry of Dairy Products.....	Quantitative Analysis I, Organic Chemistry
Chemistry of Meats.....	Quantitative Analysis I, Organic Chemistry
Research in Agricultural Chemistry....	Quantitative Analysis I, Organic Chemistry (Depends upon work undertaken)

Electives—continued

<i>Subject</i>	<i>Prerequisites</i>
CIVIL ENGINEERING:	
Surveying I	Trigonometry
Elements of Irrigation and Drainage...	None
Farm Sanitation and Water Supply....	None
DAIRY HUSBANDRY:	
Advanced Dairy Judging	Dairy Judging
Dairy Inspection I	Elements of Dairying
Milk Production	Elements of Dairying, Principles of Feeding
Butter Making and Creamery Management	Elements of Dairying, Dairy Bacteriology
Market Milk	Elements of Dairying, Dairy Bacteriology
Cheese and Ice Cream Making	Elements of Dairying, Dairy Bacteriology, and Chemistry of Dairy Products
Dairy Seminar	Dairy Inspection I, Milk Production
Dairy Research	Milk Production, Butter Making and Creamery Management
ECONOMICS:	
Agricultural Economics	None
Coöperation and Marketing	Agricultural Economics
Agricultural Land Problems	Agricultural Economics
Research in Agricultural Economics....	Agricultural Economics
Economics	None
Sociology	None
Business Organization	Economics
Labor Problems	Economics
Money and Banking	Economics
Public Finance	Economics
EDUCATION:	
Psychology	None
Educational Administration	None
History of Education	None
Educational Psychology	Psychology
Educational Sociology	None
Agricultural Education	Educational Administration
Special Methods in the Teaching of Agriculture	Educational Psychology
Rural Education	Educational Administration
Supervised Observation and Teaching in Agriculture	Educational Psychology
ELECTRICAL ENGINEERING:	
Electrical Engineering C	College Physics
Illuminating Engineering	College Physics
ENGLISH:	
Advanced Composition I	College Rhetoric II
Argumentation and Debate	College Rhetoric II
Business English	College Rhetoric II
Advertising English	College Rhetoric II
Oral English I	College Rhetoric II
Oral English II	College Rhetoric II
Methods of Teaching English	College Rhetoric II
Farm Advertising	Composition and Literature II
Farm Bulletins	Composition and Literature II
Technical Writing	Advanced Composition I, Business English, Advertising English, Farm Advertising, and Farm Bulletins
Short Story	Composition and Literature II
Community English	Composition and Literature II
English Bible	Composition and Literature II
American Literature	Composition and Literature II
ENTOMOLOGY:	
Apiculture	General Entomology
Milling Entomology	General Entomology
Horticultural Entomology	General Entomology
General Economic Entomology	General Entomology
Advanced General Entomology	General Entomology
Insect Morphology I	General Entomology
Taxonomy of Insects I	General Entomology, Insect Morphology I
Principles of Taxonomy I	(Must be taken with Taxonomy of Insects I)
Medical Entomology	General Entomology
FARM MACHINERY:	
Farm Field Machinery	None
Farm Mechanics	None
Power Farming Machinery	Farm Field Machinery
Advanced Farm Machinery	Power Farming Machinery
Farm Machinery Research	Power Farming Machinery or Advanced Farm Machinery

Electives—continued

<i>Subject</i>	<i>Prerequisites</i>
FRENCH:	
French I	None
French II	French I
French Readings	French II
French Short Stories.....	French Readings
GERMAN:	
German I	None
German II	German I
German Readings	German II
German Comedies	German Readings
German Short Stories.....	German Readings
Scientific German I.....	German Comedies or German Short Stories
Scientific German II.....	Scientific German I
HISTORY AND CIVICS:	
American History I.....	None
American History II.....	None
American History III.....	None
American Agricultural History.....	None
American Industrial History.....	None
American Political History.....	None
Pan-America	None
Modern Europe	None
European Industrial History.....	None
Current History	None
American Government	None
Comparative Government	None
Business Law I.....	None
Business Law II.....	None
Farm Law	None
HORTICULTURE:	
Systematic Pomology	None
Small Fruits	Plant Propagation
Farm Forestry	None
Dendrology	None
Silviculture	Farm Forestry or Dendrology
Practical Pomology	Systematic Pomology
Orchard Management	None
Spraying	Chemistry II
Market Gardening	None
School Gardening	None
Greenhouse Construction and Management	None
Landscape Gardening I.....	None
Landscape Gardening II.....	Landscape Gardening I
History and Literature of Landscape Gardening	None
Plant Materials of Landscape Gardening.....	Plant Propagation
Theory and Esthetics of Landscape Gardening	History and Literature of Landscape Gardening
Tree Surgery	Plant Physiology I
City and Town Planting.....	None
INDUSTRIAL JOURNALISM:	
Elementary Journalism	None
Industrial Writing	Elementary Journalism or Agricultural Journalism
Industrial Feature Writing.....	Industrial Writing
Journalism Practice I.....	May be taken with Agricultural Journalism
Journalism Practice II.....	Journalism Practice I
MATHEMATICS:	
Plane Trigonometry	Plane Geometry
College Algebra	Plane Trigonometry
Analysis of Statistics.....	None
MILLING INDUSTRY:	
Principles of Milling.....	None
Grain Marketing	Grain Crop Production
Grain Products	Grain Marketing
Milling Practice I.....	Principles of Milling
Milling Practice II.....	Milling Practice I
Wheat and Flour Testing.....	Grain Products, Organic Chemistry, and Quantitative Analysis I and II
Experimental Baking A.....	Wheat and Flour Testing

Electives—continued

<i>Subject</i>	<i>Prerequisites</i>
POULTRY HUSBANDRY:	
Practice in Poultry Feeding.....	Farm Poultry Production
Practice in Incubation.....	Farm Poultry Production
Practice in Brooding.....	Farm Poultry Production
Practice in Milk Feeding.....	Farm Poultry Production
Poultry Breeds and Types.....	None
Advanced Poultry Judging.....	Poultry Breeds and Types
Market Poultry	Farm Poultry Production
Poultry Breeding	Principles of Breeding
Poultry Farm Management.....	Grain Crop Production, Forage Crop Production, and Principles of Feeding
Poultry Bacteriology	Agricultural Microbiology
Comparative Anatomy of Domestic Birds.....	General Embryology
Poultry Research	Practice in Poultry Feeding, Practice in Incubation, and Practice in Brooding
SHOP PRACTICE:	
Woodwork I	None
Woodwork II	Woodwork I
Woodwork III	Woodwork II
Woodworking for Grammar Grades.....	None
Woodworking I for High Schools.....	Woodworking for Grammar Grades
Woodworking II for High Schools.....	Woodworking I for High Schools
Wood Turning	Woodworking II for High Schools
Foundry Practice	None
Pattern Making	Foundry Practice
Machine Tool Work I.....	Foundry Practice
Machine Tool Work II.....	Machine Tool Work I
Forging I	None
Forging II	Forging I
Forging III	Forging II
Forging IV	Forging III
STEAM AND GAS ENGINES:	
Farm Motors I.....	None
Farm Motors II.....	Farm Motors I
Dairy Refrigeration	None
VETERINARY MEDICINE:	
Farm Animals in Health and Disease...	Anatomy and Physiology
Anatomy I	None
Anatomy II	Anatomy I
Anatomy III	Anatomy II
Anatomy IV	Anatomy III
Comparative Physiology I.....	Organic Chemistry
Comparative Physiology II.....	Comparative Physiology I
Histology I	None
Histology II	Histology I
Horseshoeing	Anatomy and Physiology
Obstetrics	Anatomy and Physiology, and General Embryology
Experimental and Practical Physiology.....	Organic Chemistry, Anatomy, and Physiology
ZOOLOGY:	
General Embryology	General Zoölogy
Advanced Zoölogy I.....	General Zoölogy
Advanced Zoölogy II.....	Advanced Zoölogy I
Invertebrate Taxonomy	General Zoölogy
Vertebrate Taxonomy	General Zoölogy
Animal Ecology	General Zoölogy, General Entomology
Cytology	General Embryology
Evolution and Heredity.....	General Embryology
Dynamic Geology	None
Historical Geology	Dynamic Geology

Curriculum in Veterinary Medicine*

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
Anatomy I Vet. 201 6(3-9)	Anatomy II Vet. 202 7(3-12)
Histology I Vet. 221 3(1-6)	Histology II Vet. 222 3(1-6)
Chemistry Vet. I Chem. 105 5(3-4, 2)	Chemistry Vet. II Chem. 106 5(3-4, 2)
General Zoölogy Vet. Zoöl. 111 3(2-3)	Embryology Vet. Zoöl. 114 2(1-3)
Military Science I Mil. Tr. 101..... 1(0-3)	Military Science II Mil. Tr. 102..... 1(0-3)
Hygiene and Social Problems M Phys. Tr. 125..... R	

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Anatomy III Vet. 203 5(1-12)	Anatomy IV Vet. 204 3(1-6)
Comparative Physiology I Vet. 211 5(4-3)	Comparative Physiology II Vet. 212 3(2-3)
Medical Botany Bot. 113 2(1-3)	Pathogenic Bacteriology I Bac. 111 4(2-6)
College Rhetoric I Engl. 101 3(3-0)	Materia Medica I Vet. 131 2(2-0)
Types and Classes of Livestock Vet. An. Husb. 102..... 3(1-6)	Principles of Feeding An. Husb. 104..... 3(3-0)
Military Science III Mil. Tr. 103..... 1(0-3)	Principles of Breeding An. Husb. 106..... 3(3-0)
	Military Science IV Mil. Tr. 104..... 1(0-3)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Surgery I Vet. 151 3(3-0)	Surgery II Vet. 152 3(3-0)
Diagnosis Vet. 161 2(2-0)	Medicine I Vet. 162 4(4-0)
Materia Medica II Vet. 132 2(2-0)	Horseshoeing Vet. 156 1(1-0)
Pharmacy Vet. 134 1(0-3)	Therapeutics Vet. 133 3(3-0)
Pathology I Vet. 241 5(4-3)	Pathology II Vet. 242 6(4-6)
Pathogenic Bacteriology II Bac. 116 4(2-6)	Clinics II Vet. 172 3(0-9)
Clinics I Vet. 171 3(0-9)	

* ADJUSTMENT CURRICULA FOR CLASSES OF 1918, 1919, AND 1920

The class of 1920 will be required to complete the sophomore, junior and senior years as provided in this curriculum, except that Types and Classes of Livestock, Vet., first semester, sophomore year, is to be omitted; Histology (2 credits) and Organic Chemistry (3 credits) are to be added to this semester's work.

The class of 1919 will be required to complete the junior and senior years as provided in this curriculum, except that the course in Materia Medica, junior year, first semester, is to be a 4-credit course and Principles of Animal Breeding is to be added to the work of the second semester, junior year.

The class of 1918 will be required to complete the senior year as provided in this curriculum, except that Pathology III is to be omitted, and Principles of Breeding is to be added, first semester; Horseshoeing is to be added to the work of the second semester.

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Surgery III Vet. 153 3(3-0)	Surgery IV Vet. 154 3(3-0)
Medicine II Vet. 163 5(5-0)	Medicine III Vet. 164 5(5-0)
Pathology III Vet. 243 3(2-3)	Ophthalmology Vet. 165 1(1-0)
Meat Inspection Vet. 246 2(2-0)	Operative Surgery Vet. 155 1(0-3)
Parasitology Zoöl. 123 2(1-3)	Jurisprudence Vet. 166 1(1-0)
Clinics III Vet. 173 4(0-12)	Obstetrics Vet. 157 3(3-0)
	Dairy Inspection II Dairy Husb. 118..... 1(0-3)
	Clinics IV Vet. 174 4(0-12)

Curriculum in Animal Husbandry and Veterinary Medicine*

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

Freshman year of the Curriculum in Agriculture

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Organic Chemistry Chem. 120 3(2-2, 1)	Quantitative Analysis I Chem. 150 2(0-6)
General Zoölogy Zoöl. 105 5(3-6)	Pathogenic Bacteriology Bac. 111 4(2-6)
Anatomy I Vet. 201 6(3-9)	Anatomy II Vet. 202 7(3-12)
Elements of Dairying Dairy Husb. 101..... 3(2-3)	Grain Crop Production Agron. 101 3(2-2, 1)
Military Science III Mil. Tr. 103..... 1(0-3)	Agricultural Journalism Ind. Jour. 121..... 1(1-0)
	Military Science IV Mil. Tr. 104..... 1(0-3)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
General Embryology Zoöl. 117 3(2-3)	Forage Crop Production Agron. 102 3(2-2, 1)
Anatomy III Vet. 203 5(1-12)	Anatomy IV Vet. 204 3(1-6)
Histology I Vet. 221 3(1-6)	Histology II Vet. 222 3(1-6)
General Entomology Ent. 101 3(2-3)	Electives 7
Electives † 3	

* This curriculum is so arranged that students may receive the degree of bachelor of science in agriculture at the end of four years, and the degree of doctor of veterinary medicine at the end of two more years.

† Six semester credit hours of junior electives must be chosen from the work offered by the departments of history, economics, education, modern languages, or mathematics.

SENIOR

FIRST SEMESTER		SECOND SEMESTER	
Principles of Feeding		Principles of Breeding	
An. Husb. 104.....	3(3-0)	An. Husb. 106.....	3(3-0)
Soils		Soil Fertility	
Agron. 131	4(3-3)	Agron. 132	3(2-2,1)
Comparative Physiology I		Comparative Physiology II	
Vet. 211	5(4-3)	Vet. 212	3(2-3)
Electives	4	Materia Medica I	
		Vet. 131	2(2-0)
		Electives	5

FIFTH YEAR

Junior year of the curriculum in Veterinary Medicine

SIXTH YEAR

Senior year of the curriculum in Veterinary Medicine

Collections for Supplies or Materials Used in the Courses in Division of Agriculture

Department	Course	Semester charge
AGRONOMY:		
	Grain Crop Production.....	\$1.50
	Forage Crop Production.....	2.00
	Farm Crops	1.50
	Crop Improvement	1.00
	Advanced Forage Crops.....	1.00
	Advanced Grain Crops.....	1.00
	Crop Research	2.50
	Soils	2.00
	Soil Fertility	2.00
	Dry-land Farming	2.50
	Soils Research	3.50
	Farm Management	1.00
	Cost Accounting	1.00
	Soils and Fertilizers (School of Agriculture)....	1.00
	Farm Management and Accounts (School of Agriculture) .....	.25
	Grain and Forage Crops (School of Agriculture),	1.00
	Soil Management (Short Course).....	.25
	Grain Crops (Short Course).....	.50
	Forage Crops (Short Course).....	.50
	Farm Management (Short Course).....	.50
ANIMAL HUSBANDRY:		
	Meats	2.50
DAIRY HUSBANDRY:		
	Elements of Dairying.....	2.00
	Butter Making and Creamery Management.....	2.00
	Market Milk	1.00
	Dairy Inspection I.....	1.00
	Dairy Inspection II.....	1.00
	Dairying I (Short Course).....	1.00
HORTICULTURE:		
	Systematic Pomology	1.00
	Spraying	1.00
MILLING INDUSTRY:		
	Wheat and Flour Testing.....	5.00
	Experimental Baking A.....	2.00
	Experimental Baking H.....	2.00
	Principles of Milling.....	1.00
	Milling Practice I.....	1.00
	Milling Practice II.....	1.00
VETERINARY MEDICINE:		
	Histology I	2.50
	Histology II	2.50
	Pathology I	2.50
	Pathology II	2.50
	Pathology III	2.00

COLLECTIONS FOR SUPPLIES OR MATERIALS—*continued*

<i>Department</i>	<i>Course</i>	<i>Semester charge</i>
VETERINAR MEDICINE— <i>Continued</i> :		
Pharmacy	2.00
Operative Surgery	5.00
Anatomy I	5.00
Anatomy II	5.00
Anatomy III	5.00
Anatomy IV	5.00
Anatomy and Physiology	2.00
Physiology I	3.00
Physiology II	3.00
Experimental and Practical Physiology	2.00

Agronomy

Professor CALL	Instructor BONNETT
Associate Professor SALMON	Instructor ZAHNLEY
Associate Professor THROCKMORTON	Assistant WILSON
Assistant Professor GRIMES	Assistant CRUMBAKER
Assistant Professor KENNEY	Fellow SCOTT
Assistant Professor CUNNINGHAM	Fellow MULLEN
Instructor SEWELL	

The College farm used by the Department of Agronomy comprises 320 acres of medium rolling upland soil, well suited to experimental and demonstration work. It is well equipped with all kinds of farm machinery necessary in crop production. The general fields and experimental plots used for the breeding and testing of farm crops, and for conducting experiments in soil fertility and methods of culture, afford the student excellent opportunities for study and investigation.

Large and well-equipped laboratories for soil and crop work are maintained for the regular use of students. Material is provided for the study of the grain and forage crops best adapted to different purposes and most suitable for growing in the State. Ample greenhouse space is provided for germinating seeds under varying conditions, and for research work in soils during the winter months.

The Department of Agronomy offers courses in cereal and forage crop production and improvement, soils, soil fertility, dry-land farming, and farm management.

The following detailed description of courses will give a definite understanding of each subject given, its position in the curriculum, and the proportion of time devoted to class and to laboratory work.

COURSES IN FARM CROPS

FOR UNDERGRADUATES

101. GRAIN CROP PRODUCTION. Sophomore year, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Botany 101. Mr. Bonnett and Mr. Zahnley.

This course is a study of the distribution, relative importance, and production of grain crops, including wheat, corn, oats, barley, rye, rice, buckwheat, and flax.

102. FORAGE CROP PRODUCTION. Sophomore year, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Botany 101. Assistant Professor Kenney.

This course is a study of the distribution, relative importance, value, and production of forage crops, including sorghums, alfalfa, clover, and the grasses.

103. FARM CROPS. Sophomore year, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Mr. Bonnett and Mr. Zahnley.

This course consists of a study of the more important grain and forage crops, especially from the production viewpoint.

FOR GRADUATES AND UNDERGRADUATES

201. CROP IMPROVEMENT. Junior and elective, first and second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Agronomy 101. Associate Professor Salmon and Mr. Bonnett.

This course takes up the principles of crop improvement and applies them to special crop problems. The laboratory work consists largely of classification and identification of varieties of important crops and exercises in judging threshed grain.

202. ADVANCED GRAIN CROPS. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agronomy 101. Mr. Bonnett.

Special phases of grain crop production are discussed in class. The laboratory work is devoted largely to identification and judging of threshed grain.

203. ADVANCED FORAGE CROPS. Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agronomy 102. Assistant Professor Kenney.

Special phases of forage crop production are discussed in class. The laboratory work is devoted largely to identification of varieties and a study of market classes and grades.

204. SPECIAL CROPS. Elective, second semester. Class work, one hour. One semester credit. Prerequisites: Agronomy 101 and 102. Mr. Bonnett.

The distribution, climatic and soil requirements, relative importance, and production of sugar beets, cotton, flax for fiber, hemp, tobacco and other minor crops are studied.

205. PRINCIPLES OF AGRONOMIC EXPERIMENTATION. Elective, first semester. Class work, one hour. One semester credit. Prerequisites: Agronomy 201 and 132. Associate Professor Salmon.

A discussion of the principles of experimentation in general is followed by their application to agronomic problems. Important contributions to agronomic science are studied from the historical viewpoint.

206. AGRONOMIC SEMINAR. Elective, second semester. Class work, one hour. One semester credit. Prerequisites: Agronomy 101, 102 and 131. Professor Call.

In this course students are required to review before the class timely articles appearing in bulletins and current periodicals.

FOR GRADUATES

301. CROPS RESEARCH. Both semesters and summer school. Laboratory, three to fifteen hours. One to five semester credits according to the work done. Prerequisites: Agronomy 201 and Botany 101. Associate Professor Salmon.

Students choose or are assigned special problems for investigation. The work must be satisfactorily completed and presented as a thesis for credit. Students should make arrangements for this course before taking out an assignment.

COURSES IN SOILS**FOR UNDERGRADUATES**

131. SOILS. Junior year, first semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisite: Chemistry 102. Professor Call, Associate Professor Throckmorton, and Mr. Sewell.

This course deals with the origin and formation, texture and composition, and management of soils to conserve moisture and liberate plant food.

132. SOIL FERTILITY. Junior or senior year, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Chemistry 150 and Agronomy 131. Professor Call, Associate Professor Throckmorton, and Mr. Sewell.

Factors influencing the fertility of the soil, the effect of different systems of farming on soil fertility, and management of the soil to conserve its fertility receive most attention in this course.

FOR GRADUATES AND UNDERGRADUATES

231. DRY-LAND FARMING. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Agronomy 131. Associate Professor Throckmorton.

The principles underlying the practice of dry-land farming are studied. Students interested only in farming practices in dry regions may take the class work without the laboratory.

232. ADVANCED SOIL FERTILITY. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agronomy 132. Associate Professor Throckmorton.

This course is a continuation of Agronomy 132.

233. SOIL SURVEY. Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agronomy 131. Associate Professor Throckmorton.

Types of soils of the United States and methods of mapping soil areas are studied in this course. Special attention is given to the study of Kansas soils in the field.

234. SOIL MANAGEMENT. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agronomy 132. Associate Professor Throckmorton.

This course deals with the management of soils under irrigation and with the management of wet, sandy and eroded soils and with other types requiring special methods of working.

FOR GRADUATES

331. SOILS RESEARCH. Both semesters and summer school. Laboratory, three to fifteen hours. One to five semester credits, according to the work done. Prerequisites: Agronomy 132 and Chemistry 150. Professor Call and Associate Professor Throckmorton.

Students are assigned special soil problems. The completion of the work entitles them to credit according to the amount of work done.

COURSES IN FARM MANAGEMENT**FOR GRADUATES AND UNDERGRADUATES**

261. FARM MANAGEMENT. Elective, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits.

Prerequisites: Agronomy 101 and 102, and Animal Husbandry 104. Assistant Professor Grimes.

The selection of a farm, the planning and arrangement of the farm factors effecting the success of the farm business and methods of leasing.

262. **ADVANCED FARM MANAGEMENT.** Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agronomy 261. Assistant Professor Grimes.

This course is a continuation of Agronomy 261.

263. **COST ACCOUNTING.** Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Assistant Professor Grimes.

Various systems of farm records and accounts are studied to acquaint the student with the more practical methods.

FOR GRADUATES

361. **FARM MANAGEMENT RESEARCH.** Both semesters and summer school. Laboratory, three to fifteen hours. One to five semester credits. Prerequisite: Agronomy 261. Assistant Professor Grimes.

Students are assigned special farm-management problems. The completion of the work entitles them to credit according to the amount of work done.

Animal Husbandry

Professor COCHEL
Professor WENTWORTH
Associate Professor MCCAMPBELL
Assistant Professor VESTAL
Instructor GATEWOOD

Instructor PATERSON
Instructor VANDERWILT
Assistant GRAY
Fellow AUBEL

The Department of Animal Husbandry owns 140 acres of land, and rents 460 acres for the maintenance of herds and flocks of purebred horses, cattle, sheep, and hogs. The College livestock has attained a national reputation among the breeders and feeders on account of the many prize-winning animals produced.

The feed yards and barns are well arranged for experimental feeding, and the maintenance of the herds. The laboratory of the animal husbandry student is, as a matter of fact, the feed yard and the animal. He studies the animal from the standpoint of the breeder and of the feeder. He learns to combine the needs of each and to find these qualities exemplified in the perfect animal.

The courses of study in this department are arranged to give the student special instruction in the selection, breeding, feeding, marketing, and management of all classes of livestock. Attention is also given to the sanitary conditions and treatment of the more common forms of disease to which the animals are subject.

COURSES IN ANIMAL HUSBANDRY

FOR UNDERGRADUATES

101. **TYPES AND CLASSES OF LIVESTOCK.** Freshman year, both semesters and summer school. Class work, one hour; laboratory, six hours. Three semester credits. Professor Wentworth, Assistant Professor Vestal, Messrs. Gatewood, Paterson, and Gray.

This course consists of a study of the market and breeding types and classes of horses, cattle, sheep, and swine. Text: Vaughan's *Types and Market Classes*.

Laboratory.—Practice in scoring and judging market and breeding animals.

102. TYPES AND CLASSES OF LIVESTOCK (VET.). Sophomore year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Associate Professor McCampbell.

One-fourth of this course is given by members of the Dairy Husbandry Department. A study is made of the market and breeding types and classes of horses, beef cattle, dairy cattle, sheep and swine. Text: Vaughan's *Types and Market Classes*.

Laboratory.—Practice in scoring and judging market and breeding animals.

104. PRINCIPLES OF FEEDING. Junior year, both semesters and summer school. Class work, three hours. Three semester credits. Prerequisites: Veterinary Medicine 205, and Chemistry 120. Assistant Professor Vestal.

This course involves a study of the digestive system and the processes of nutrition, and of the theory of practical economy of rations, both for the maintenance and for the fattening of all classes of farm animals.

106. PRINCIPLES OF BREEDING.* Junior year, both semesters and summer school. Class work, three hours. Three semester credits. Prerequisite: Zoölogy 105. Professor Wentworth.

This course embraces the general principles of heredity, variation, sex-limited inheritance, prepotency, fertility and sterility, systems of breeding, and the influence of pedigree and herd-book standards.

108. HISTORY OF BREEDS AND PEDIGREES. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Animal Husbandry 101.

A study is made of the early history and development of purebred domestic animals; also a sufficient study of herd books and pedigrees to acquaint students with the leading strains and families of the different breeds of horses, cattle, sheep, and swine. Text: Plumb's *Types and Breeds of Farm Animals*.

110. LIVESTOCK MANAGEMENT. Elective, first and second semesters. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Animal Husbandry 104. Mr. Paterson.

Practice is given in the feeding, care, and management of horses, cattle, sheep, and hogs.

112. PORK PRODUCTION. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Animal Husbandry 104. Mr. Gatewood.

This course comprises a systematic study of the most successful and economical methods of growing and finishing hogs, both for breeding purposes and for pork production.

114. MUTTON PRODUCTION. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Animal Husbandry 104. Mr. Paterson.

This course comprises a systematic study of the most successful and economical methods of growing and finishing sheep, both for breeding purposes and for mutton production.

* Students are advised to elect Zoölogy 117, first semester of junior year, preparatory to this course.

116. ADVANCED STOCK JUDGING I. Elective, first semester. Laboratory, six hours. Two semester credits. Prerequisite: Animal Husbandry 101. Associate Professor McCampbell.

This course deals with the judging of market classes as well as with all different breeds of purebred stock. The stock is judged in groups of from four to six animals in the same manner that is customary at county or state fairs.

118. ADVANCED STOCK JUDGING II. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Animal Husbandry 116. Associate Professor McCampbell.

This is a continuation of Animal Husbandry 116. During the work of the semester, occasional trips are made to the best livestock farms of the State, where the students have an opportunity to judge and to observe the management of herds and flocks as handled by the most successful stockmen of the State.

120. MEATS. Elective, first and second semesters. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisites: Animal Husbandry 104 and 106.

This course includes a study of the killing, dressing, cutting and curing of beef, pork and mutton.

122. BEEF PRODUCTION. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Animal Husbandry 104. Professor Cochel.

This course is devoted to a study of the most successful and economical methods of producing beef cattle for market. Various rations, comparisons of long and short feeds, the advisability of grain and of grass feed, and all questions pertaining to the production of beef are considered.

124. HORSE PRODUCTION. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Animal Husbandry 104. Associate Professor McCampbell.

This course involves a study of the most successful methods of growing and developing young horses and mules and of the most satisfactory rations for horses, together with an investigation of the best methods of preparing horses for market.

126. FORM AND FUNCTION IN FARM ANIMALS. Elective, first semester. Laboratory, six hours. Two semester credits. Prerequisite: Animal Husbandry 118. Associate Professor McCampbell.

A detailed and specific study of animal form and type, the influence of type upon function, the relation of form, type and condition as affecting growth and development. Comparative measurements of growing and fattening animals, speed and draft horses, mutton and wool sheep, and lard and bacon type of hogs.

128. TEACHERS' COURSE IN ANIMAL HUSBANDRY. Elective, summer school. Class work, five hours. Two semester credits. Professor Cochel.

This course is planned to give a general review of the livestock industry with the purpose of encouraging a better standing of the teaching of animal husbandry in secondary schools. The course will include some work in judging and some attention will be paid to production.

FOR GRADUATES AND UNDERGRADUATES

201. ADVANCED FEEDING. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Animal Husbandry 104. Assistant Professor Vestal.

This course consists of a survey of the experimental feeding of horses, cattle, sheep and hogs, together with a study of the fundamental and

practical feeding problems of the various sections of the country. Emphasis is placed upon the results obtained in the experimental investigation of these problems.

202. LIVESTOCK MARKETING. Elective, first semester. Class work, two hours. Two semester credits. Prerequisites: Economics 102 and 216. Professor Cochel.

This course includes a study of the art of marketing livestock and livestock products, freight and insurance rates in transit, liability of carrier and shipper, terminal charges, etc. Commissions for sale or storage. The relation of market prices of grain and hay upon contemporary values of livestock and meat.

204. ANIMAL HUSBANDRY SEMINAR. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Animal Husbandry 108.

206. ANIMAL GENETICS. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisites: Zoölogy 117 and Animal Husbandry 106 or Botany 205. Professor Wentworth.

This course offers opportunity for individual problems in experimental heredity. Facilities are afforded for inheritance studies in laboratory animals. The lectures treat of disputed questions of heredity. In case work with domestic animals is elected, Animal Husbandry 208 must be taken in the following semester.

208. ADVANCED ANIMAL GENETICS. Elective, second semester. Class work, one hour; laboratory work, three hours. Two semester credits. Prerequisite: Animal Husbandry 206. Professor Wentworth.

This course is a continuation of Animal Husbandry 206. Library reference work takes the place of lectures.

Dairy Husbandry

Professor REED
Associate Professor FITCH
Assistant OLSON
Fellow FAIRCHILD

The College dairy farm, including the buildings and yards, consists of fifty acres of medium upland. This land is used for growing corn, alfalfa, and other crops, such as cowpeas, field peas, and sorghum, and for the pasture of the dairy herd.

The barn is built on the most approved model for the housing of dairy cattle, and is light, well-ventilated, and sanitary, with stalls for one hundred ten cows. Four silos of modern type, feed rooms, a milk room, a boiler room and a laboratory exist in connection with the barn. Each of these illustrates some especially desirable feature in dairy building and construction.

The dairy herd consists of excellent types of the four dairy breeds: Jersey, Guernsey, Ayrshire, and Holstein. These animals are purebred, and a number have been entered in the advanced registry of their respective breeds. The excellence of the dairy herd is shown by an average production for the past year of over 400 pounds of butter by the Guernseys, 475 pounds by the Ayrshires, over 500 pounds by the Jerseys, and

572 pounds by the Holsteins. Maid Henry, a thirteen-year-old Holstein, produced 19,600 pounds of milk, yielding 835 pounds of butter in one year. Canary Bell, an Ayrshire, produced in one year 17,406.4 pounds of milk, containing 668.16 pounds of fat, which is equivalent to 786 pounds of average butter. This is the second highest record ever made in Kansas. The Owl's Design ranks high among the Jerseys of the world, with a record of 14,606 pounds of milk produced in one year. She has also produced 764 pounds of butter in a year.

The dairy building houses the creamery, the cheese rooms, the classrooms, and the offices, and the necessary laboratories for testing and hand-separator work. Refrigeration is secured from a refrigerating machine and ice plant installed in the building. These facilities of barn, herd, and laboratories are in constant use by the students of dairying. The instruction in dairy husbandry includes the study of the selection and breeding of dairy animals, the production of milk, its manufacture into butter, cheese, and other dairy products, or its sale on the market.

COURSES IN DAIRY HUSBANDRY

FOR UNDERGRADUATES

101. ELEMENTS OF DAIRYING. Sophomore year, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Associate Professor Fitch, Mr. Tomson and Mr. Olson.

This is a general course in dairying, dealing with the secretion, composition and properties of milk, with the factors influencing the quantity and quality of milk, and with the care of milk and cream on the farm. It includes a study of the different methods of creaming, the construction and operation of farm separators, the principles and application of the Babcock test, the use of the lactometer, and butter making on the farm. Lectures, supplemented by text, Wing's *Milk and Its Products*.

Laboratory.—Practice is given in operating the Babcock test and lactometer, separation of milk, and farm butter making.

102. TYPES AND CLASSES OF LIVESTOCK (VET.). Freshman year, first semester. Associate Professor Fitch.

One-fourth of this course, which is described more fully under the Department of Animal Husbandry, is given by members of the Department of Dairy Husbandry, and comprises the judging and scoring of dairy cattle.

104. DAIRY JUDGING. Freshman year, first and second semesters. Laboratory, three hours. One semester credit. Associate Professor Fitch and Mr. Tomson.

This course calls for the judging of dairy stock from the standpoint of economical production and breed type. Score cards are used for the purpose of training the student to become accurate, thorough and systematic in the selection of animals as representatives of breeds or for breeding purposes. No textbook is required. *Types and Breeds of Farm Animals*, by C. S. Plumb, and Breeders' Association literature are used as references.

106. DAIRY INSPECTION I. Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisites: Bacteriology 106, Chemistry 254 and Dairy Husbandry 101. Mr. Olson.

Advanced work is given in the testing of dairy products, including testing for adulterations. Practice is given in the use of score cards for inspecting and grading milk depots, dairy farms, and creameries. The

course is designed to give training in the duties of a city, state, or government inspector or commissioner. State and city ordinances governing the handling and public sale of dairy products are outlined. Text: Farrington and Woll's *Testing Milk and Its Products*.

108. MILK PRODUCTION. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: Dairy Husbandry 101 and Animal Husbandry 104. Professor Reed.

This course deals with the economical production of milk and with the most approved method of handling the dairy herd, also the construction of dairy barns and buildings, and other subjects which relate to the dairy farmer.

110. BUTTER MAKING AND CREAMERY MANAGEMENT. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Dairy Husbandry 101 and Bacteriology 211. Mr. Olson.

This course comprises a study of the principles of creamery butter making, the construction and care of creameries and their appliances, methods of sampling and grading cream, pasteurization, starter making, cream ripening, and creamery accounting. Text: McKay and Larson's *Principles and Practice of Butter Making*.

Laboratory.—Practice is given in the sampling and grading of milk and cream; in separating and ripening cream; in the preparation and use of the starter in pasteurized and in raw cream; in churning; in working, washing, salting, and packing butter; and in keeping complete records of each operation. The work also includes the making of salt, fat, and moisture determinations of the finished product, and judging and scoring butter.

112. HOME DAIRYING. Elective, last half of second semester. Class work, two hours; laboratory, three hours. One and one-half semester credits. Professor Reed and Mr. Tomson.

This course includes a study of the composition of milk, Babcock testing, separation of milk, cream ripening, and farm butter making; also a brief study of the breeds of dairy cattle. It is given with the elective course, Poultry Husbandry 102, which is offered the first half of the second semester.

114. CHEESE AND ICE-CREAM MAKING. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Chemistry 254, Bacteriology 211, and Dairy Husbandry 101. Mr. Olson.

This course includes the making of cheese on the farm for home use and for sale, and the commercial manufacture of Cheddar cheese, comprising each detail from the receipt of the milk to the marketing of the finished product. The cheese work is given the first half of the semester; the manufacture and handling of ice cream and ices for the retail and wholesale trade, in the second half. Text: Van Slyke-Publow's *The Science and Practice of Cheese Making*.

Laboratory.—Practice is given in making cheese under farm conditions and on a commercial scale. Records are kept of the different operations and their influence upon the finished product is noted. Exercises are given in testing, judging and scoring cheese. The latter half of the semester is devoted to the making of ice cream and ices.

116. MARKET MILK. First semester. Lecture, one hour; laboratory, three hours. Two semester credits. Prerequisites: Dairy Husbandry 101, and Bacteriology 211. Mr. Olson.

This course includes a study of the classes of market milk (certified, inspected and pasteurized, also other classifications), equipment and methods for clean milk production, and the relation of clean milk to pro-

ducer, dealer, and consumer. Also systems of milk inspection, score cards and milk and cream contests. Lectures are also given on milk plants, including their methods and equipment, such as receiving, storing, separating, removing sediment, pasteurization, bottling and capping, cleaning and sterilizing bottles and cans, the use of homogenizer and emulser and practical laboratory methods of examining milk.

Laboratory.—The work includes actual practice in all the steps in the production of market milk and cream in the College milk plant.

118. DAIRY INSPECTION II. Senior year, second semester. Laboratory, three hours. One semester credit. Mr. Tomson.

This course comprises the testing of dairy products, the inspection and scoring of dairies and milk depots, and the testing for adulterants in dairy products. Text: Farrington and Woll's *Testing Milk and Its Products*.

FOR GRADUATES AND UNDERGRADUATES

201. ADVANCED DAIRY JUDGING. Elective, second semester. Laboratory, three hours. One semester credit. Associate Professor Fitch.

This course is a continuation of Dairy Husbandry 101. Visits are made to the best farms in the State and students are given an opportunity to judge and to handle stock kept by the most successful breeders.

202. DAIRY SEMINAR. Elective, second semester. Class work, one hour. One semester credit. Prerequisites: Dairy Husbandry 101, 106 and 108. Professor Reed.

This course includes a study and review of dairy periodicals and experiment station bulletins, books and other dairy literature.

FOR GRADUATES

301. DAIRY RESEARCH. First and second semesters. By appointment. Three semester credits. Prerequisites: Dairy Husbandry 108 and 110.

This course gives credit on special problems assigned to students. Professor Reed.

Horticulture

Professor DICKENS
Professor AHEARN
Assistant Professor MERRILL

Assistant DOERNER
Assistant CALVERT
Fellow DALE

A wealth of illustrative material for classes in all horticultural subjects is found in the large collection of species growing upon the College campus, in the orchard plantations, and in the greenhouses.

The horticultural grounds consist of eighty acres of land devoted exclusively to horticultural and forestry work and gardens, and to nurseries. Orchards and vineyards are maintained for experimental and demonstrative work. A full equipment of tools, spraying machinery, and special apparatus used in horticulture, floriculture and gardening is available for the use of the students. The College grounds furnish one of the finest laboratories in the State for the study of landscape gardening.

The instruction in the Department of Horticulture covers fruit judging, plant propagation, pomology, gardening, small fruits, spraying, orcharding, and landscape gardening. The following descriptions give detailed accounts of the instruction in these various fields.

COURSES IN HORTICULTURE

FOR UNDERGRADUATES

101. PLANT PROPAGATION. Freshman year, second semester and summer school. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Botany 101. Professor Dickens and Assistant Professor Merrill.

A discussion of natural and cultural methods of propagation; seeds, seed testing, and seed growing; the treatment required for different kinds of seeds, the production of seedlings for stock; grafting, budding, layering; the making of cuttings, and the special requirements for propagating commercial fruits and ornamental plants. The work is given by means of lectures and assigned readings.

Laboratory.—Practical work is given in the preparation of seeds and in seed testing; in the preparation of seed beds, and in the use of seeding machinery; in transplanting, grafting, budding, and in general nursery practice.

104. SYSTEMATIC POMOLOGY. Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Professor Ahearn.

This comprises exercises in identification and description of the different types of fruits, such as grapes, peaches, apples, pears and citrus fruits. An intercollegiate exchange of fruit makes possible a valuable study of the effect of climatic conditions upon variety and characteristics. Work is also done in the selection, preparation and judging of fruits for exhibits. Text: Waugh's *Systematic Pomology*.

107. ORCHARDING. Sophomore year, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Horticulture 101. Professor Dickens.

This includes studies of the necessary conditions for success with orchards, including location, improvement of soil, application of fertilizers and cultural methods and pruning.

Laboratory.—A study in laying out plantations and orchards. Various systems of setting, topography of various localities, adaptability of level and hilly sections, methods of setting, pruning for setting, work in orchards with trees of various species and varying ages and a study and observation of cover crops, methods of cropping and general orchard practices up to bearing age.

110. SMALL FRUITS. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Horticulture 101. Professor Dickens.

The small fruits of commercial importance are considered with reference to their requirements as to soil, fertilizers, cultivation and protection. The management of small areas designed to furnish a supply of fruits for home use, and the handling of commercial plantations are considered.

113. FARM FORESTRY. Elective, first semester. Class work, three hours; laboratory, three hours. Four semester credits. Professor Dickens.

This course consists of a study of the needs of Kansas farms for windbreaks and woodlots for post and fuel production, forest conservation, maintenance and handling timber and soil best suited for this purpose. The growing of trees in locations better suited for timber than for other crops. The composition of windbreaks and their value as a protection to home orchards and fields.

Laboratory.—Includes identification of species, methods of forming windbreaks and nursery work in transplanting trees of various sizes and an opportunity to determine the rate of growth of trees under various conditions.

116. DENDROLOGY. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Professor Ahearn.

Classification and identification of forest trees, including a study of forest ecology and taxonomy, the classification of commercial species, relative importance of timber species and the life history and requirements of trees.

Laboratory.—Work in the College arboretum and excursions to nearby wood lots. The student is given an opportunity to become acquainted with trees that succeed well in this State.

119. SILVICULTURE. Elective, second semester. Class work, two hours; field work, three hours. Three semester credits. Prerequisite: Horticulture 113 or 116. Professor Dickens.

A study of the business of tree growing for timber and economic purposes. Requirements of species, their range and requirements as to soils, climate and the various factors that determine their reproduction and rate of growth. Protection of forests from fire and insects and the application of various systems of silviculture.

FOR GRADUATES AND UNDERGRADUATES

201. PRACTICAL POMOLOGY. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Horticulture 104. Assistant Professor Merrill.

The class work is given by means of lectures, and includes practical information on harvesting, grading, packing, storage, marketing and the use of fruit by-products.

Laboratory.—Consists of field work in harvesting fruit and practice in grading and packing fruit. Several types of mechanical graders are used for demonstrations and the various types of commercial box and barrel are offered. One-third of the laboratory work will be given to pruning practice.

204. ORCHARD MANAGEMENT. Elective, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Assistant Professor Merrill.

The class work includes studies of the following factors that are of vital importance to fruit growers: Location, soil improvement, cultural methods, pruning, capital and equipment for handling orchards and studies of crop disposition.

Laboratory.—This course offers practice in establishing young orchards, spraying (orchard work), pollination studies, thinning of fruit, summer pruning and problems in orchard management.

207. SPRAYING. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Chemistry 102. Assistant Professor Merrill.

The class work consists of lectures on spraying machinery, accessories and the principal materials used as insecticides and fungicides.

Laboratory.—Laboratory exercises offer practice in preparing and testing spraying mixtures and in the use of the various types of spraying machinery. Nozzles and spraying accessories are carefully tested.

210. MARKET GARDENING. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Professor Ahearn.

This course is made as practical as possible. In the classroom the lecture work is reinforced with problems concerning the business end of market gardening. The students are required to prepare seed orders and estimate the cost per acre of growing various garden crops. Particular stress is laid upon the harvesting, storing and marketing of vegetables.

Laboratory.—This work is given in the College gardens. Each student is assigned a plot of ground to plant and care for during the semester. Careful records are kept of cultural operations and the yields. Disease and insect control is studied in a practical way.

213. GARDENING. Junior year, second semester. Class work, three hours. Three semester credits. Professor Ahearn.

It is the purpose of this course in gardening to give young women a working knowledge of and a close acquaintance with the garden as it concerns the home. The first part of the course is concerned with the principles of plant growth, relation of soils to plants and the methods necessary for successful work in kitchen gardening, flower beds, window gardening, the requirements of plants in regard to watering, temperatures, hotbeds and the first principles of floriculture.

In the latter part of the course the young women are introduced to the principles of landscape gardening, with particular reference to the problems of home plantings. In conjunction with the lectures, each member of the class is required to prepare plans for town home, farm home and country place, and the classes are required to do group work that will give them an insight into the needs of school grounds, play grounds, public parks and cemeteries are considered and are given a considerable amount of time.

Particular emphasis is placed upon acquaintance with materials that are used for garden purposes. The College campus, gardens and greenhouses furnish a wealth of material that is best adapted to garden problems and landscape composition.

216. LANDSCAPE GARDENING I. Elective, second semester and summer school. Class work, two hours; laboratory, six hours. Four semester credits. Professor Ahearn.

Designed for the individual needs of students and for those who expect to take advanced work in landscape art. The principles of landscape gardening are studied and civic improvement problems discussed with special attention given to rural and city problems.

Laboratory.—The laboratory consists of field trips and work in fields, in excavation and leveling. Students are instructed in the delineation of landscape plans with special reference to the home and city planning.

219. GREENHOUSE CONSTRUCTION AND MANAGEMENT. Elective, first semester. Class work, three hours. Three semester credits. Professor Ahearn.

This course consists of work covering the more important points of greenhouse construction and the proper methods of conducting the greenhouse business. Not only is this subject treated from the commercial standpoint, but the management of private conservatories is also carefully studied.

220. SCHOOL GARDENING. Elective, second semester and summer school. Class work, two hours; laboratory, three hours. Three semester credits. Assistant Doerner.

The object of this course is to give teachers a knowledge of the principles which underlie success in gardening and the adaptation of small areas to the production of vegetables and flowers. The subjects of soil preparation, seed selection, fertilizers, hotbeds, plant manipulation, and the planning of the garden are given special consideration. Opportunity is given for teachers to become familiar with general garden methods and the use and manipulation of garden tools, including seeders, weeder and wheel hoes. Allotments of ground areas required for different crops, the length of time required to mature various vegetable and flower crops, the adaptation of these to country and city schools, and suggestions for marketing, are among the subjects considered.

222. HISTORY AND LITERATURE OF LANDSCAPE GARDENING. Elective, first semester. Class work, two hours. Two semester credits. Assistant Doerner.

A study of the chronological order of the history and literature of landscape gardening with special reference to the early influences as they govern modern design.

225. PLANT MATERIALS OF LANDSCAPE GARDENING. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Horticulture 101. Professor Ahearn.

A thorough study is made of the hardiness, form, color, habits, and adaptations of trees, both deciduous and evergreen, shrubs, hardy perennials, biennials and annuals with a view to giving the student a working knowledge of the materials essential to formulate a working landscape plan.

227. LANDSCAPE GARDENING II. Elective, second semester. Laboratory, nine hours. Three semester credits. Professor Ahearn.

A study of the more advanced problems of designing and reconstruction from topographic and transit surveys as offered by large areas of parks, playgrounds and country estates.

230. THE THEORY AND AESTHETICS OF LANDSCAPE GARDENING. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Horticulture 222. Assistant Doerner.

A careful study is made of the underlying principles of landscape art and design. This course is primarily intended for students who wish to specialize in landscape work, but will be of interest to all those who intend to teach.

233. TREE SURGERY. Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Botany 208. Assistant Professor Merrill.

A study and practice of the most approved methods of caring for ornamental trees and the technical details of planting, pruning and spraying, bolting, chaining and cavity work. Shade tree legislation and the duties of shade-tree commissions and tree wardens.

237. CITY AND TOWN PLANNING. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Assistant Doerner.

This course has to do with the laying out of forests and planting of same. A study is also made of civic centers, of cities and towns located in different parts of the world.

Milling Industry

Professor FITZ
Instructor DUNTON
Miller PELEGAR

The Department of Milling Industry was primarily established by the Board of Regents to undertake investigations in the handling, marketing and milling of wheat. Every student of agriculture should have some knowledge of this subject, and also of the handling of grain products other than those obtained from wheat. A full and complete knowledge of the needs of grain growing as an industry must necessarily include the utilization of grain in the manufacture of food, together with the natural by-products resulting therefrom.

The department has a well-equipped plant, consisting of six double-stand 7" x 14" rolls, with necessary cleaning machinery and dust collectors, sifters, and purifiers. The results secured here are comparable with those from a regular commercial mill. A baking laboratory equipped with proofing closet, dough mixer, and electric ovens is open for student use, as is also a laboratory for chemical tests on wheat and flour.

COURSE IN MILLING INDUSTRY

FOR UNDERGRADUATES

101. PRINCIPLES OF MILLING. Sophomore year, second semester. Laboratory, three hours. One semester credit. Miller Phlegar.

This course includes a study of the theory and practice of milling with demonstrations on a small experimental mill.

102. GRAIN MARKETING. Junior year and elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Agronomy 101. Professor Fitz.

This course includes a study of methods of handling, storing, marketing and grading of grain; the history of the origin and development of grain inspection and grades; a study of commercial grain grades and government standards; the classification and organization of inspection system; the organization and functions of grain exchanges or boards of trade; and principal grain markets, with receipts, shipments, and consumption.

103. GRAIN PRODUCTS. Junior year and elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Milling Industry 102. Professor Fitz.

A brief study of the methods of manufacturing food products from cereals, with the resulting by-products, and a comparison of composition and feeding value of these by-products.

FOR GRADUATES AND UNDERGRADUATES

201. MILLING PRACTICE I. Junior year and elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Milling Industry 101. Miller Phlegar.

This course consists of practice in the art of milling, with demonstrations on a model mill.

202. MILLING PRACTICE II. Senior year, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Milling Industry 201. This course is a continuation of Milling Industry 201.

203. WHEAT AND FLOUR TESTING. Senior year, first semester. Class work, one hour; laboratory, nine hours. Four semester credits. Prerequisites: Milling Industry 103, Chemistry 120, 150 and 250. Miss Dunton.

This course includes special quantitative tests applied to cereals and their by-products; methods for analysis and interpretation of results.

204. EXPERIMENTAL BAKING A. Senior year, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Milling Industry 203.

This course includes practice in baking tests; comparison of methods, formulas, and flour; and interpretation of results.

205. EXPERIMENTAL BAKING H. Elective, senior year. Second semester. Laboratory, six hours. Two semester credits. Prerequisite: Domestic Science 102. Miss Dunton.

This course includes demonstration in milling and practice in bread making; comparison of methods, yeasts and flours, and a study of the more important conditions which influence the quality of bread.

Poultry Husbandry

Professor LIPPINCOTT *
Acting Professor SHERWOOD
Assistant FOX
Superintendent HARRIS

The poultry plant, occupying eight acres and situated just north of the northeast corner of the College campus, is devoted to the breeding and rearing of the stock used for class work. It is equipped with various types of houses, runs, incubators and brooders, and with flocks of the leading breeds of fowls.

There is in the government and state experiment stations and in schools and colleges an increasing demand for men with experience and systematic training in handling poultry. There is likewise a growing demand for men to enter poultry-packing houses or capable of managing poultry-farming enterprises of considerable proportions.

COURSES IN POULTRY HUSBANDRY

FOR UNDERGRADUATES

101. FARM POULTRY PRODUCTION. Sophomore year, both semesters and summer school. Class work, one hour; laboratory, three hours. Two semester credits. Professor Lippincott, Professor Sherwood and Mr. Fox.

This course takes up the problems of poultry management on the general farm. The subjects of feeding, housing, breeding, incubation, brooding and preparing poultry for market are studied.

102. HOME POULTRYING. Elective, second semester. Class work, three hours for the first half of the semester. One and one-half semester credits. Professor Lippincott and Mr. Fox.

This course takes up the problems of poultry management for egg and meat production. The subjects of feeding, breeding, housing, incubation, brooding, and preparing poultry for market are studied. It is given with the elective course, Dairy Husbandry 112, the second half of the semester.

104. PRACTICE IN POULTRY FEEDING. Elective, first semester. Three times a day, seven days a week, for a period of six weeks, at hours outside of the regular schedule. One semester credit. Prerequisite: Poultry Husbandry 101. Mr. Fox.

This course consists of the actual care of a flock of fowls by the student under the supervision of an instructor. Careful records are kept of the feeds consumed and the eggs produced. A financial statement is required at the end of the feeding period.

105. PRACTICE IN INCUBATION. Elective, second semester and summer school. Three times a day, seven days a week, for a period of not less than four weeks at hours outside of regular schedule. One to two semester credits. Prerequisite: Poultry Husbandry 101. Mr. Fox.

* Absent on leave, 1916-'17.

This course consists of the care of an incubator by the student through the incubation period, testing the eggs and bringing off the hatch. Careful records of fertility, cost of incubation, and varying temperature, moisture, and ventilation conditions are kept. For one credit one successful hatch must be brought off in either a hot air or hot water incubator. For further credit other types must be operated. Students specializing in poultry husbandry must take two credits.

107. PRACTICE IN BROODING. Elective, second semester and summer school. Three times a day, seven days a week, for a period of not less than four weeks; at hours outside the regular schedule. One to three semester credits. Prerequisite: Poultry Husbandry 101. Mr. Fox.

In this course each student handles a flock of chicks. He has the entire care of brooding and feeding them during the most critical weeks. A report of cost of fuel and feed, of gains in weight and of mortality is required. This course must be preceded or accompanied by practice in incubation. For one credit, a group of at least fifty chicks must be successfully brooded for four weeks, in any one of the several types of brooders. For further credits, broods must be handled successfully in two other types of brooders for at least six weeks. Students specializing in poultry husbandry must take three credits.

108. PRACTICE IN MILK FEEDING. Elective, first semester. Twice a day, seven days a week, for a period of six weeks, at hours outside the regular schedule. One semester credit. Prerequisite: Poultry Husbandry 101. Mr. Fox.

This course consists of milk feeding poultry confined in crates. The time is divided into periods of two weeks, so that the student will have an opportunity to fatten three lots of chickens. A financial statement is required.

110. POULTRY BREEDS AND TYPES. Elective, first semester and summer school. Class work, one hour; laboratory, three hours. Two semester credits. Professor Lippincott and Professor Sherwood.

In this course a historical study is made of the various breeds commonly found on the Kansas farm. Particular attention is paid to tracing the evolution of the present breed types. The laboratory is given over largely to judging the different breeds and varieties both by score card and by comparison.

111. ADVANCED POULTRY JUDGING. Elective, second semester. Laboratory, three hours. One semester credit. Prerequisite: Poultry Husbandry 110. Offered every other year. Will be given in 1918-1919. Mr. Fox.

This course is a continuation of Poultry Husbandry 110, giving further practice in judging the more common varieties, and taking up some of the rarer breeds.

FOR GRADUATES AND UNDERGRADUATES

201. MARKET POULTRY. Elective, first semester and summer school. Class work, one hour; laboratory, three to six hours. Two to three semester credits. Prerequisite: Poultry Husbandry 101. Mr. Fox.

In this course the lectures will cover the methods of handling market poultry, alive and dressed. For three hours of laboratory work, practice will be given in candling and grading eggs, caponizing, killing, cooling, grading and packing poultry for market. When six hours of laboratory work is taken, the student will also feed three lots of chickens for a period of two weeks each.

202. POULTRY BREEDING. (In coöperation with the Department of Animal Husbandry.) Elective, second semester. Conferences and laboratory, six hours. Two semester credits. Prerequisite: Animal Husbandry 106. Professor Lippincott and Professor Wentworth.

The experimental work on inheritance in poultry is reviewed by means of assigned readings and laboratory experiments.

POULTRY FARM MANAGEMENT. See Agronomy 262.

POULTRY BACTERIOLOGY. See Bacteriology 216.

204. COMPARATIVE ANATOMY OF DOMESTIC BIRDS. Elective, second semester. Offered alternate years. Given 1918-1919. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Zoology 117. Professor Lippincott.

This course is designed particularly for those intending to teach or carry on research in poultry husbandry, or who are particularly interested in bird study. The various structures of domestic birds are discussed in the lectures, in their relation to the same structure in wild forms, and in a limited measure other vertebrates, as well as from a development standpoint.

The laboratory work is given over to the discussion and the first-hand comparison of the structures of the several species of domestic birds common in the central West.

205. POULTRY RESEARCH. Elective, first semester. Two to four semester credits. Prerequisites: Poultry Husbandry 101, 104, 105 and 107. Professor Lippincott and Acting Professor Sherwood.

In this course the student pursues a definite line of investigation concerning some phases of poultry work. Arrangements must be made to continue this work throughout the second semester when the problem attacked can not be solved within the limits of the first semester.

Veterinary Medicine

Professor _____
 Professor GOSS
 Professor DYKSTRA
 Associate Professor BURT

Instructor HOBBS
 Instructor PATTERSON
 Assistant SCOTT
 Assistant ELDER

The Department of Veterinary Medicine gives most of the technical work in the course in veterinary medicine, a general description of which is given elsewhere. The department is housed in the Veterinary Building, which was erected at a cost of over \$60,000 and is thoroughly equipped throughout. It contains modern classrooms, and its laboratories possess the necessary appliances for illustrating the several subjects required. The mode of instruction is more specifically detailed in succeeding sections.

The courses in anatomy require several lecture rooms, which contain models, skeletons, and bones of all kinds, and a thoroughly sanitary dissecting room equipped with all of the latest materials necessary to give a course in anatomy second to none on the continent.

For work in histology and pathology the department is exceedingly well provided. It has over thirty large microscopes, equipped with both high and low power, and several oil immersion objectives, microtomes, the best reflectoscope and projectoscope obtainable, besides a large assortment of histological and pathological slides, materials, and specimens for use in demonstration work in class and laboratory.

The equipment for instruction in physiology is ample to give the student a thoroughly comprehensive course of laboratory study.

For the study of *materia medica* and pharmacy there is a general pharmacy laboratory containing all the drugs used in the practice of veterinary medicine, and a practicing pharmacy where medicines are compounded for the every-day practice connected with the College.

For instruction in surgery and clinic the equipment is excellent. The surgical amphitheater is an annex to the main Veterinary Building, seating over three hundred people, and equipped with every modern appliance for performing before the classes the most delicate operations upon both large and small animals. The hospital has a capacity of about thirty animals and is nearly always filled with patients, which gives ample material for study of internal medicine as well. The out-clinic furnishes many cases yearly, giving the student opportunity to become familiar with the diseases and their treatment under the guidance of proficient practitioners.

The policy adhered to in the instruction in all the departments is that the science of veterinary medicine is the foundation, and the art merely supplementary. A thorough drill is given in the foundation studies, and later in the course practical application of these is made in actual field work. This result is a thoroughly scientific veterinary education.

In the arrangement of the schedule of the veterinary course it is implied that the course should be followed in its regular sequence, as each year's work depends upon the work done the previous year. Certain subjects, however, may be selected as electives if a student has the necessary prerequisites. These subjects are listed in the list of electives.

COURSES IN ANATOMY

FOR GRADUATES AND UNDERGRADUATES

This branch of veterinary medicine extends over the freshman and sophomore years for veterinary students, and one semester is required in the course in agriculture.

The classroom instruction consists of lectures, quizzes and recitations and special dissection of the part under discussion, also a study of dissected specimens, various models, and the Azoux model of the horse. Mounted skeletons and limbs, and loose bones are abundant in the museum. The horse is taken as a type and the other domestic animals are compared with the horse, as often as necessary parts of other animals are dissected to show the differences.

The subjects for dissection are preserved by the injection of a formalin solution followed by a starch solution colored red, which fills and hardens within the arteries. Each half of the subject is divided into three parts, namely the head and neck; fore limb and thorax; hind limb and posterior half of body. The students work in pairs, each pair dissecting one part before passing on to another part. The work is arranged so that bones are first studied, then the muscles and joints. This is followed by the dissection of the circulatory and nervous systems. The viscera of certain regions are studied by the students at work on those respective parts, *i. e.*, the abdominal organs are studied by the students at work on the hind limb, etc.

In addition to numerous atlases and charts furnished by the College, the student is required to have Sisson's *Veterinary Anatomy* as a textbook and Sisson's *Dissecting Guide* as a laboratory guide.

201. ANATOMY I. Freshman year, first semester. Class work, three hours; laboratory and dissection, nine hours. Six semester credits. Doctor Burt.

This course consists of the osteology, or the study of the bones and the dissection of one-third of the horse. The bones of the horse are studied in detail and a comparison of the bones of other domestic animals, including man and chicken, is made. Drawings of the bones are made by the students in order that he obtain a better mental picture of their shape and characteristic parts. The bones of the head are studied separately and collectively. Careful attention is given to the sinuses of the head and points of ossification. For convenience the horse is divided into three regions or parts for dissection, therefore, the one-third dissected during this semester may be any third of the subject, depending upon the part upon which the student is working.

202. ANATOMY II. Freshman year, second semester. Class work, three hours; dissection, twelve hours. Seven semester credits. Prerequisite: Veterinary Medicine 201. Doctor Burt and Doctor Scott.

This course is a continuation of the work begun in Veterinary Medicine 201. The course deals with myology and arthrology. The student is required to make a careful dissection of the muscles of the body, learning their location, attachments and relations one to another, as well as their relations to other important structures. After the muscles are dissected and learned the student dissects the ligaments of the various joints. The student also studies the viscera of the respective part at the time of dissection of that part. Check cards and drawings indicating the different stages of dissection are kept, and the work is checked at frequent intervals.

203. ANATOMY III. Sophomore year, first semester. Class work, one hour; dissection, twelve hours. Five semester credits. Prerequisite: Veterinary Medicine 202. Doctor Burt.

This course and Veterinary Medicine 204 consist of the study of angiology and neurology, and all parts not previously dissected. Having had osteology and myology, the student is now prepared to get an accurate mental picture of the distribution, location and relation of the blood vessels and nerves. As in Veterinary Medicine 202, the subject is divided into three parts. During this semester two parts will be dissected, leaving one part for Veterinary Medicine 204. Drawings are required as in Veterinary Medicine 202.

204. ANATOMY IV. Sophomore year, second semester. Class work, one hour; dissecting, six hours. Three semester credits. Prerequisite: Veterinary Medicine 203.

This course is a continuation of Veterinary Medicine 203. The student will now complete the dissection of every part of the subject, including special parts, as the foot, brain, eye, etc. In addition to the completion of the dissection of the horse, a comparative study of the principal structural differences of the various domestic animals, not studied concurrently with the previous courses, will now be made.

205. ANATOMY AND PHYSIOLOGY. Sophomore year, first semester. Class work, three hours; laboratory and dissection, six hours. Five semester credits. Doctor Burt, Doctor Patterson and Doctor Scott.

This combined course is planned to give the agricultural student a general idea of the anatomy or structure of the domestic animal and the functions of the various organs. As far as possible the two parts will

be taught concurrently. The object sought is to aid the student in understanding conformation by means of the study and dissection of the structures beneath the skin, at the same time observing the muscles of locomotion and the various levers, both as regards speed and power of draughting. Considerable attention is given to the digestive and genital systems. The function of the various parts are studied, so that the student can realize and understand the benefits derived from the judicious application of proper breeding, feeding and care of farm stock. Attention will be directed to parts subjected to diseases and perverted, physiological functions. Text: In addition to notes, Strangeway's *Anatomy* and F. Smith's *Manual of Veterinary Physiology* will be used.

CLINICS

FOR UNDERGRADUATES

171. CLINICS I. Junior year, first semester. Laboratory, eight hours or more. Three semester credits. Doctor Dykstra and Doctor Patterson.

A free clinic which affords an abundance of material is conducted. All species of domesticated animals are presented for treatment. These patients are assigned in regular order to the senior students for diagnosis and treatment; clinic sheets are provided, on which are recorded the history, symptoms, pulse, temperature, respiration, diagnosis, prognosis, treatment, and the unsoundness, defects or blemishes of the animal. The clinician in charge discusses all the abnormal conditions present in the patient, thus assisting the student to develop his powers of observation. The junior students assist the senior students and, in addition, are required to master, by practical experience, the restraint of animals, bandaging, etc. The compounding of prescriptions, the preparation of antiseptics and other medicinal agents, is taken in charge by the junior students.

172. CLINICS II. Junior year, second semester. Laboratory, eight hours or more. Three semester credits. Doctor Dykstra and Doctor Patterson.

This work is a continuation of course 171.

173. CLINICS III. Senior year, first semester. Laboratory, twelve hours. Four semester credits. Doctor Dykstra and Doctor Patterson.

Patients left at the hospital for treatment are assigned to seniors, who are required to administer all medicines, change dressings of surgical wounds, etc. All work is performed under the direct supervision of the clinician in charge. Numerous country calls are received by the veterinary department, which are taken care of by one of the clinicians, and who is always accompanied by one or more senior students. This phase of the work is particularly valuable, as it gives the student practical experience under actual conditions.

174. CLINICS IV. Senior year, second semester. Laboratory, twelve hours. Four semester credits. Doctor Dykstra and Doctor Patterson.

This work is a continuation of course 173.

COURSES IN HISTOLOGY

FOR GRADUATES AND UNDERGRADUATES

Lectures and recitations cover the work, which is done in the laboratory. During the lectures the projectoscope is used to illustrate the tissues studied. It is essential that the student obtain a thorough knowledge of the manipulation of the microscope, of the microscopical structure of the normal animal tissues, and of the methods of fixing, embed-

ding, sectioning, staining and mounting tissues. This work gives the foundation for the study of pathological histology. Each student must prepare a full set of slides, from which he makes high- and low-power drawings.

221. HISTOLOGY I. Freshman year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Doctor Goss and Doctor Elder.

The first part of the semester is spent upon the care and manipulation of the microscope, in the use of which the student must become proficient. This is followed by a microscopical examination of cotton, woolen, silk and linen fibers, bubbles of air, and drops of oil, to enable the student to recognize these when they are accidentally mounted with tissue. The fundamental tissues are next studied: epithelial tissues with regard to form, structure, arrangement and location; connective tissues with regard to structure and location, including bone development and teeth and their development; muscular tissue, voluntary, involuntary, and cardiac; nerve tissue, the structures and forms of its cells, of medullated and nonmedullated nerve fibers; spinal cord; the blood vessels, heart, and lymphatic vessels. Blood corpuscles are studied with regard to size, shape, and structure, including each kind of white corpuscles. Also, the blood forming organs as bone-marrow, lymph glands, and spleen are studied. The histology of the digestive tract is studied, including a study of the mouth, the tongue, the taste buds, the parotid, the submaxillary and sublingual, the thyroid and thymus glands, and the œsophagus. In this semester the student studies and mounts sixty-five slides, some of which are teased, and many of which are sectioned in paraffin and celloidin. Textbook: *Histology*, by Stohr, or *Histology*, by Bailey.

222. HISTOLOGY II. Freshman year, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Doctor Goss and Doctor Elder.

In this semester the student takes up the study of the stomachs of the dog, the horse, and the ox; the small intestines—duodenum, jejunum, and ileum; the large intestines; caecum, colon, rectum and anus. This semester also includes the microscopic study of the liver, the pancreas, the respiratory tract—nasal mucous membrane, larynx, trachea, bronchi and lungs; the urinary organs—kidney, ureter, bladder, urethra; the male and female genital organs; the skin and its appendages; the suprarenal gland; the medulla; the cerebellum; the cerebrum; the eye; and the ear. During this semester the student stains, mounts, studies with microscope and makes drawings of the above-mentioned tissues. Some of the tissues studied are injected with gelatine mass to bring out the blood vessels. Textbook: *Histology*, by Stohr, or *Histology*, by Bailey.

MATERIA MEDICA

FOR UNDERGRADUATES

131. MATERIA MEDICA I. Sophomore year, second semester. Class work, two hours. Two semester credits. Doctor Patterson.

The course includes definitions of terms, modes of action of drugs in general, their method and rapidity of absorption and elimination, physiological and chemical incompatibles, etc. The drugs and medicinal agents are grouped according to their action. The lecturer discusses the origin, physical properties, active constituents, and official preparations of the medicinal agents.

132. MATERIA MEDICA II. Junior year, first semester. Class work, two hours. Two semester credits. Doctor Patterson.

This course is a continuation of Veterinary Medicine 131.

133. THERAPEUTICS. Junior year, second semester. Class work, three hours. Three semester credits. Prerequisites: Veterinary Medicine 131 and 132. Doctor Patterson.

The student is thoroughly drilled in the physiological action of the various drugs, or action on the healthy animal, and the therapeutic action, or action on the diseased animal. A course in toxicology is included in this work, taking up the symptoms and treatment of poisons frequently encountered in veterinary practice. The science of posology, or dosage, is considered of the utmost importance, and a liberal amount of time is devoted to it, taking up the proper dose of the crude drug and its preparation for the horse, cow, dog, cat, and swine. Reference works: Winslow's *Veterinary Materia Medica and Therapeutics*; *United States Dispensatory*; Wood's *Therapeutics, its Principles and Practice*.

134. PHARMACY. Junior year, first semester. Class and laboratory work, one hour. One semester credit. Doctor Patterson.

In the lectures the meaning of the various pharmaceutical terms are discussed. Various systems of weights and measures, and the conversion of one system into another, are taught. Official preparation of each are studied in regular order. Particular stress is placed upon prescription writing, the student being taught to avoid incompatibilities, to give nouns the proper case ending, and to understand the meanings of certain Latin phrases. In the laboratory work the principles of filtration, percolation, hot-water and sand baths, etc., are taught. The student is required to prepare at least one of each of the following preparations: An infusion, a decoction, a tincture, a wine, a syrup, a fluid extract, a liniment, an emulsion, a liquor, an aqua, spirit, avolus, an ointment, an electuary, and a cataplasm. In addition, a thorough course in the compounding of prescriptions is afforded at the clinic, where all medicines are prescribed and compounded by the students, under guidance of the instructor in charge. Reference works: *U. S. Pharmacopœia*; Maltbie's *Practical Pharmacy*; Remington's *Practice of Pharmacy*; Fish's *Exercises in Materia Medica and Pharmacy*.

COURSES IN MEDICINE.

FOR UNDERGRADUATES

161. DIAGNOSIS. Junior year, first semester. Class work, two hours. Two semester credits. Doctor ———.

This is a course preparatory to the study of medicine proper. It takes up in detail the different diagnostic methods employed for the detection of diseases, including auscultation, percussion, palpation, and inspection, and also treats of the normal and abnormal abdominal and thoracic sounds, and considers in detail the specific examination of the various organs, including diagnostic inoculations as an aid to the detection of disease.

162. MEDICINE I. Junior year, second semester. Class work, four hours. Four semester credits. Doctor ———.

The noninfectious diseases of the respiratory organs are studied in this course, taking up in regular order the nasal and accessory cavities, the larynx, bronchi, lungs, and pleura.

163. MEDICINE II. Senior year, first semester. Class work, five hours. Five semester credits. Doctor ———.

This course is devoted to noninfectious diseases of the mouth, salivary glands, œsophagus, stomach and intestines, liver, pancreas, and peritoneum. This is followed by diseases of the urinary organs, of the circulatory organs, diseases of metabolism, of the nervous system, of the organs of locomotion, and the skin.

164. MEDICINE III. Senior year, second semester. Class work, five hours. Five semester credits. Doctor ———.

In contradistinction to the preceding courses in medicine, the distinctly infectious and contagious diseases of domesticated animals are discussed. The following order is usually adopted: Acute general infectious diseases, acute exanthematous infectious diseases, acute infectious diseases with localization in certain organs, infectious diseases with special involvement of the nervous system, chronic infectious diseases, infectious diseases produced by protozoa. In addition particular attention is given to propagation and spread of infectious diseases, predisposing and exciting causes of disease, general sanitation, etc.

165. OPHTHALMOLOGY. Senior year, second semester. Class work, one hour. One semester credit. Doctor ———.

This course discusses the method of conducting examinations of the eye by means of the ophthalmoscope, illumination of the eye, and the use of drugs as an aid to this process; and acute and chronic diseases of the eye.

Reference books for the courses in medicine: Hutyra and Marek's *Pathology of the Diseases of Domestic Animals*, Vols. I and II; Friedberger and Frohner's *Veterinary Pathology*, Vols. I and II; Law's *Veterinary Medicine*, Vols. I, II, III, IV, and V; Moussu and Dollar's *Diseases of Cattle*; Glass' *Diseases of the Dog*; Cadiot's *Clinical Veterinary Medicine*.

166. JURISPRUDENCE. Senior year, second semester. Class work, one hour. One semester credit. Doctor ———.

This course deals with the veterinarian's legal responsibilities, national and state livestock laws, quarantine regulations, etc.

167. FARM ANIMALS IN HEALTH AND DISEASE. Elective, second semester and summer school. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Veterinary Medicine 205. Doctor Patterson.

Study of the domestic animals in relation to their surroundings. First-aid treatment of diseases; contagious and noncontagious diseases; the sound horse. Text: Craig's *Common Diseases of Farm Animals*.

OBSTETRICS

FOR UNDERGRADUATES

157. OBSTETRICS. Senior year and elective, second semester. Class work, three hours. Three semester credits. Prerequisites: Veterinary Medicine 204 and Zoölogy 114, or Veterinary Medicine 205 and Zoölogy 117. Doctor Dykstra.

This course discusses in detail the physiology of pregnancy, anatomy of the generative organs, care and hygiene of pregnant animals, sterility, diseases incidental to pregnancy, diseases of new-born animals, care of new-born animals, abnormal presentations during parturition, surgery of obstetrics, etc. This work is supplemented by demonstrations on an obstetrical phantom and foetus; in addition, the College farm and surrounding agricultural territory furnish an abundance of actual material. References: Williams' *Veterinary Obstetrics*, Williams' *Surgical and Obstetrical Operations*, De Bruin's *Bovine Obstetrics*, and Fleming's *Veterinary Obstetrics*.

PATHOLOGY

FOR GRADUATES AND UNDERGRADUATES

The laboratory is equipped with microscopes, microtomes, paraffin ovens, microphotographic and projection apparatus. Each student is furnished with a microscope, and locker containing staining dishes and stains. Material is furnished the student for embedding, sectioning and staining tissues for microscopic study. In addition, the student is furnished many mounted slides for study, which contain the pathological lesions to which the domestic animals are subject. In addition to this, the material from the post-mortem of animals and material sent to the College from over the state furnish ample material for laboratory diagnosis.

241. PATHOLOGY I. Junior year, first semester. Class work, four hours; laboratory, three hours. Five semester credits. Prerequisites: Veterinary Medicine 222 and 212 and Bacteriology 111. Doctor Goss and Doctor Elder.

The course in general pathology treats of the history of pathology, predisposition, immunity, congenital and inherited disease; circulatory disturbances—cardiac difficulties, hyperaemia, hemorrhage, dropsy, oedema, thrombosis, embolism, and alteration of the blood; disturbances in metabolism—fever, necrosis, atrophy, cloudy swelling, fatty changes, inflammation, calcification and concrement formation; and process of repair, tumors, and functional disturbances. Text: *Comparative General Pathology*, by Kitt.

242. PATHOLOGY II. Junior year, second semester. Class work, four hours; laboratory, six hours. Six semester credits. Doctor Goss and Doctor Elder.

This course is devoted to special pathology and pathological technique; collecting, fixing, hardening, embedding in celloidin and paraffin, sections of fresh, frozen, and embedded tissues; and a study of the method of preserving gross specimens. Considerable time is devoted to stains and the method of staining. This work is followed by special pathology, which includes the macroscopic and microscopic examination of the following tissues in all of the pathological conditions to which they are subject: cardiac muscle, skeletal muscle, the liver, the kidney, the bladder, the pancreas, the lungs, digestive tract, the serous membranes, the vascular system, lymph nodes, the spleen, bone, skin, and genital organs. The students stain, mount, study, and make drawings of the above-mentioned tissues. Textbooks: *Pathology*, by Delafield and Prudden; *Pathologische Anatomie*, by Kitt; and *Pathology*, Vol. II, by Adami and Nichols.

243. PATHOLOGY III. Senior year, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Doctor Goss and Doctor Elder.

This course is devoted to the pathology of the infectious diseases and to laboratory diagnosis. Post-mortem examinations are made on all animals dying in the hospital at the College barns and in the neighborhood. The students attend and take turn in holding the autopsy. Each student is expected to keep a written report of the pathological changes, also of the microscopic findings. The above work is done under the direction of the pathologist in charge. Text: *Pathology of Infectious Diseases*, by Moore.

244. PATHOLOGICAL TECHNIQUE AND DIAGNOSIS I. Elective, first and second semesters. Laboratory, six hours. Two semester credits. Prerequisite: Veterinary Medicine 243. Doctor Goss and Doctor Elder.

This course consists of practice in post-mortem and laboratory diagnosis. The various methods of embedding and staining of tissues are carried out upon the large collection of material which the laboratory contains, as well as the material which is constantly coming into the laboratory from various parts of the State.

245. PATHOLOGICAL TECHNIQUE AND DIAGNOSIS II. Elective, first and second semesters. Laboratory, eight hours. Four semester credits. Doctor Goss and Doctor Elder.

This course is a continuation of Veterinary Medicine 244.

246. MEAT INSPECTION. Senior year, first semester. Class work, two hours. Two semester credits. Doctor Goss.

The course in meat inspection is designed to prepare experts for national, state, and local sanitary work, which is being more strongly urged and demanded every day. The kinds and classes of stock, the traffic and transportation of animals, their inspection before death, their slaughter, the normal conditions of healthy animals, the diseases discernible at the time of slaughter, the disposition of the condemned from economic, hygienic and sanitary standpoints, and different preparations and methods of preservation, adulterations, sanitary laws and regulations, and all other points bearing upon the question of healthful meat production, are considered. Visits are made to the local slaughtering establishments, and to the large packing plants in Topeka, Kansas City, or Wichita. Text: Edelman's *Meat Hygiene*, translated by Mohler and Eichorn.

COURSES IN PHYSIOLOGY

FOR GRADUATES AND UNDERGRADUATES

The courses in physiology are divided into Comparative Physiology, Animal Physiology, Human Physiology, and Experimental and Practical Physiology.

211. COMPARATIVE PHYSIOLOGY I. Sophomore year, first semester. Class work, four hours; laboratory, three hours. Five semester credits. Prerequisites: Veterinary Medicine 201 and 222, and Chemistry 106. Doctor Burt and Doctor Scott.

This course treats of the physiology of domestic animals, beginning with the study of the blood, heart, blood vessels, and continuing with the ductless glands and internal secretions, respirations, digestion, and absorption. Textbook: *A Manual of Veterinary Physiology*, by Fred Smith.

Laboratory.—The laboratory work consists of a practical application of the knowledge derived in the classroom. The laboratory is equipped with all necessary material and apparatus to make a detailed study of the composition and digestive action of the saliva, gastric juice, bile, pancreatic and intestinal juices. Hormones and other substances in relation to their influence upon the production and action of the digestive juices are also considered. The composition and properties of the blood are studied by the aid of chemical, microscopic and spectroscopic methods. Textbook: Halliburton's *Essentials of Chemical Physiology*.

212. COMPARATIVE PHYSIOLOGY II. Sophomore year, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Doctor Burt and Doctor Scott.

The work of this semester is a continuation of Veterinary Medicine 211 and treats of the urine and urinary system, nutrition, animal heat, muscular and nervous symptoms, locomotion, generation and development, growth and decay. Textbook: Smith's *A Manual of Veterinary Physiology*.

Laboratory.—The laboratory work consists of a study of the normal urine, determining the composition, quantitatively as well as qualitatively. Tests for the detection of abnormal constituents, such as bile, blood-sugar and albumen, are applied to normal and also pathological urine. Microscopic examination is made for blood casts, blood, etc. The laboratory work in practical physiology consists in studying the phenomena associated with the nervous, muscular, respiratory and circulatory systems, and making graphic records of the same. References: *Urine of the Horse and Man*, by Fish; *Practical Physiology*, by Hemmeter; *An Introduction to Physiology*, by Porter, and standard textbooks.

213. HUMAN PHYSIOLOGY. Sophomore year, second semester. Class work, three hours. Three semester credits. Prerequisites: Chemistry 102 and 120. Doctor Burt and Doctor Scott.

The instruction consists of a study of the composition of the bones, blood, lymph, and all the secretions of the body, with their respective functions. The functions of the tissues and glands, the structure and functions of the digestive tract, of the respiratory tract, of the skin, of the nervous system and of the organs of special sense are all considered. The lecture room is equipped with skeletons, papier-mâché manikins, and models of the eye, ear, etc. Demonstrations relative to the subject under discussion are made as often as is practicable. Textbook: Martin's *Human Body*. References: Bailey's *General Physiology*, and Howells' *Physiology*.

214. EXPERIMENTAL AND PRACTICAL PHYSIOLOGY. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisites: Chemistry 120 and Veterinary Medicine 205. Doctor Burt and Doctor Scott.

This course is intended to supplement the lectures in Physiology, so that the student will make a practical application of the knowledge obtained in the classroom. It will embrace the study of the composition of the body tissues and of the secretion and excretions of the various glands; the various enzymes and their physiological relation to the digestion of the food substances; absorption, assimilation, and metabolism. The composition and properties of the blood will be studied by spectroscopic, microscopic and chemical methods. Graphic records of the blood pressure and of the pulse as well as the phenomena that attend the contraction of muscles will be made. References: Stewart's *Manual of Physiology* and *Practical Physiology*, by Peabody, and others.

COURSES IN SURGERY

FOR UNDERGRADUATES

151. SURGERY I. Junior year, first semester. Class work, three hours. Three semester credits. Doctor Dykstra.

This course includes methods of restraint; asepsis and antisepsis; anæsthesia, both local and general; inoculations, bandaging, massage, controlling hemorrhage; division of tissues and the uniting of wounds; injections of medicines into the subcutaneous tissues, blood streams, trachea, spinal canal. Animal dentistry is taken up very thoroughly, in so far as it constitutes an important part of the veterinarian's work. The students have free access to a large number of museum specimens of abnormal teeth. Also, many dental patients are presented at the College hospital for treatment.

152. SURGERY II. Junior year, second semester. Class work, three hours. Three semester credits. Doctor Dykstra.

This course considers in regular order the surgical diseases of the head, neck, thorax, abdomen, stomach and bowels, urinary organs, and organs of generation.

153. SURGERY III. Senior year, first semester. Class work, three hours. Three semester credits. Doctor Dykstra.

During this course particular attention is paid to causes, symptoms and treatment of lameness. It considers in detail fractures and their reduction, diseases of joints, tendons and sheaths, muscles and fascia, and surgical diseases of the foot.

154. SURGERY IV. Senior year, second semester. Class work, three hours. Three semester credits. Doctor Dykstra.

Surgery as taught during this course includes special operations, such as neurectomies, autoplasties, desmotomies, actual cauterization, tenotomies, myotomies, enterectomy and enteroanastomosis, and surgery of the eye. Reference books: Dollar's *Regional Veterinary Surgery*; Merillat's *Veterinary Surgery*, Vols. I, II, and III; Williams' *Surgical Operations*; Fleming's *Operative Veterinary Surgery*, parts I and II; White's *Restraint of Domestic Animals*.

155. OPERATIVE SURGERY. Senior year, second semester. Laboratory, three hours. One semester credit. Doctor Dykstra.

Old horses are purchased by the department, placed on the operating table, anæsthetized, and over one hundred operations are performed on the animal. During this work the student is required to observe a careful technique, such as antisepsis, and, in fact, performs the operation as thoroughly and completely as possible. It is a very practical course and fits the student for surgical work in actual practice.

156. HORSESHOEING. Junior year and elective, second semester. Class work, one hour. One semester credit. Doctor Dykstra.

The course is taught by means of lectures, recitations and demonstrations, taking up the various divisions in the following order: normal conformation in both limb and foot, the anatomy of these parts, physiological movements and correct normal shoeing. This is followed by a study of the proper shoeing for the correction of wry limbs and feet; diseases of the feet, and the relation of horseshoeing thereto. The course ends with a study of the shoeing of mules and oxen. Throughout the entire course the purpose is to instill in the mind of the student normal shoeing, in order that he may be able to correct abnormalities in the foot and limb in so far as this can be accomplished by shoeing. Reference books: Lungwitz's *Textbook of Horseshoeing*; Dollar's *Handbook of Horseshoeing*.

Short Course in Agriculture and Creamery Short Course

The Agricultural College offers primarily four-year courses in agriculture, which give the student fundamental training in the sciences relating to agriculture, and their application to the production of crops and livestock and to farming in general. Such a course not only equips a man to become a successful farmer, but makes of him a better citizen, and a leader in the broader duties of life.

Many young men with aspiration for an agricultural education in school are denied the opportunity of taking a complete college course. This institution offers to such persons a two-year short, practical course in agriculture, commonly called the Farmers' Short Course. Some young

men desire to engage in the creamery business. To such the institution offers the Creamery Short Course covering a period of eight weeks for one year only. These courses are offered during the winter months when most young men who really desire practical instruction are able to attend with little loss to the farm business.

GENERAL INFORMATION

REQUIREMENTS FOR ADMISSION

Students over seventeen years of age are admitted to the Farmers' Short Course or to the Creamery Short Course without examination. All students entering are required to be present at the beginning of the term.

CERTIFICATE

A certificate will be granted Farmers' Short Course students who satisfactorily complete forty-eight credit hours work of the first and second years, and to Creamery Short Course students who successfully complete the required eight-week course and who show satisfactory evidence of having spent at least six months successfully in actual work in a creamery, either previous to or after the time the course is taken.

COST

The expense for eight weeks need not exceed \$75, exclusive of railroad fare. A matriculation or entrance fee of \$5 for all students resident in Kansas and \$10 for nonresidents, an incidental fee of \$3, and a sick-benefit fee of 50 cents are payable at enrollment. Laboratory charges to cover the cost of material used and broken should not exceed \$3. A gymnasium suit costing \$2.75 to \$3 will be required of those taking physical training. Reference and textbooks will not cost more than \$10. For further information write President H. J. Waters, Manhattan, Kan.

SELF SUPPORT

These courses are primarily practical. They bring the student into actual contact with farm conditions and products. Besides the classroom work many hours each week are spent in the judging pavilion, laboratory, shop and barn. Altogether this leaves the student but little time for outside labor, and short-course students are advised to come provided with as nearly all the necessary funds for the term as possible.

DESCRIPTION OF THE WORK

The Farmers' Short Course covers a period of sixteen weeks, eight weeks each year for two years. The entire time of the student is occupied in learning how to do the various things which are necessary for the production of good crops and good livestock, and for the business management of the farm. The subjects taught in such a course cover as much as can be given in the time, and are made intensely practical in

presentation. The student is taught *why* and *how* to do the various farm operations. The student who has not taken scientific work is not able to study agricultural subjects from the same standpoint as one trained in chemistry, physics, zoölogy, etc., but can get from his work in class and laboratory the art of doing these things properly. The farmer needs to know how to select stock and crops that will be best adapted to his environment, and the short course trains him to do this. He needs to know how to prepare his soil for the reception of the seed, and how to manage his feed so as to make the greatest gains in feeding livestock. These things are taught successfully to short-course students.

The required work of the first year covers the chief phases of farming on the average Kansas farm. Besides these required subjects the first-year student takes two or three electives. These may be in agriculture or in engineering or shop work. They thus provide the opportunity for each student to meet his own interests or needs.

In the second year larger liberty is given in the selection of the work. Sixteen credit hours must be taken in group I, as outlined hereafter. The subjects in this group all deal with practical agricultural problems. All of the work of the second year may be selected from this group if the student so desires, or after having selected sixteen credit hours from group I, four or five subjects may be selected from group II (subjects dealing with problems in rural engineering). While the minimum work to be passed in each short-course term is twenty-four credit hours, many short-course students take twenty-five, twenty-six or even twenty-seven credit hours each term.

The Creamery Short Course is for eight weeks only. Its aim is to combine theory and practice in butter, cheese and ice-cream making, and also the handling of market milk.

Farmers' Short Course

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and laboratory, respectively.

FIRST YEAR

REQUIRED:

Soil Management	4(3-2)
Judging Livestock	4(1-6)
Feeding Livestock	2(2-0)
Farm Horticulture	3(2-2)
Dairying I	4(2-4)
Poultry	1(1-0)
Total	18

ELECTIVES:

Grain Crops	4(3-2)
Forage Crops	4(3-2)
Breeding Livestock	2(2-0)
Livestock Sanitation	3(3-0)
Gas Engines	3(1-4)
Traction Engines	2(0-4)
Carpentry I or Blacksmithing I	2(0-4)
Farm Field Machinery	1(0-2)
Physical Training	1(0-2)
Special Lectures	1(1-0)

SECOND YEAR

GROUP I.—AGRICULTURAL ELECTIVES

(16 credit hours must be taken in this group)

Grain Crops	4(3-2)
Forage Crops	4(3-2)
Breeding Livestock	2(2-0)
Livestock Sanitation	3(3-0)
Advanced Stock Judging.....	3(0-6)
Farm Management	4(3-2)
Dairying II	5(3-4)
Fruit Growing	5(3-4)
Spraying	2(1-2)
Incubation and Brooding.....	3(0-6)
Market Poultry	1(0-2)
Bee Culture	3(2-2)
Farm Insects	3(3-0)
Rural Life	2(2-0)

GROUP II.—ELECTIVES IN RURAL ENGINEERING

Gas Engines and Automobiles.....	2(0-4)
Gas Engines or Traction Engines.....	2(0-4)
Practical Electricity	2(2-0)
Carpentry I or Carpentry II.....	2(0-4)
Blacksmithing I or Blacksmithing II.....	2(0-4)
Power Farming Machinery.....	2(0-4)
Concrete Construction	2(2-0)
Concrete Construction Laboratory.....	2(0-4)

Subjects Taught in the Short Course

AGRONOMY

1. GRAIN CROPS. Elective. Class work, three hours; laboratory, two hours. Four credits. Associate Professor Salmon, Mr. Bonnett and Mr. Zahnley.

This course consists of a practical study of grain-crop production, especially for Kansas conditions. In the laboratory exercises are given the identification of different kinds of threshed grain and the determination of damage and market classes and grades.

2. FORAGE CROPS. Elective. Class work, three hours; laboratory, two hours. Four credits. Assistant Professor Kenney and Mr. Zahnley.

A practical study is made of the distribution and production of important forage crops, especially for Kansas conditions.

3. SOIL MANAGEMENT. First year. Class work, three hours; laboratory, two hours. Four credits. Professor Call, Associate Professor Throckmorton, and Mr. Sewell.

The various soil types common in Kansas are studied, especially with reference to their economical management for the production of profitable crops and the maintenance of fertility.

4. FARM MANAGEMENT. Elective. Class work, three hours; laboratory, two hours. Four credits. Assistant Professor Grimes.

In this course the work in the various agricultural courses is correlated and placed on a practical workable basis. The principles of farm accounting, distribution of capital, laying out of fields, planning rotations, etc., are given first consideration.

10. RURAL LIFE. Class work, two hours. Two credits. Dean Jardine and Mr. Durham.

The purpose of this course is to help students become acquainted with the essentials of a prosperous rural community, especially those concerned with better business and better living. The deficiencies of rural life and their remedies; the country town; rural organization and coöper-

eration along economic, social, educational, moral and religious lines; tenancy and rural credit and leadership, are among the subjects considered.

ANIMAL HUSBANDRY

1. JUDGING LIVESTOCK. First year. Class work, one hour; laboratory, six hours. Four credits. Associate Professor McCampbell, Assistant Professor Vestal, Messrs. Gatewood, Paterson and Gray.

This work includes careful drill in judging and showing horses, beef cattle, dairy cattle, sheep and hogs. The student first becomes familiar with the leading types by use of the score card, and later learns to judge by comparison. The aim throughout this work is not so much to make judges of the students as to render them so familiar with the best types that they may be able to select stock that will give the best returns from every standpoint. Text: Gay's *Principles and Practice of Judging Livestock*.

3. FEEDING LIVESTOCK. First year. Class work, two hours. Two credits. Professor Cochel.

The work in feeding comprises (1) a study of all the common feedstuffs of Kansas, including mill feeds and factory by-products as well as those grown on the average farm; and (2) a survey of the best feeding practices for the production of meat, milk and work. In connection with the former a rather detailed study of the composition of the feedstuffs is made, and with the latter a study of their effect upon the products sought. Text: Henry's *Feeds and Feeding*.

5. BREEDING LIVESTOCK. Elective. Class work, two hours. Two credits. Professor Wentworth.

Studies are made for the purpose of determining ways and means of preventing the birth of individuals not highly efficient as producers of human food or for work. Some of the topics discussed are, crossing, hybridization, grading, line breeding, inbreeding and prepotency.

7. ADVANCED STOCK JUDGING. Elective. Laboratory, six hours; three credits. Prerequisite: Animal Husbandry I. Associate Professor McCampbell.

This course deals largely with the judging of breeding classes of horses, cattle, sheep, and swine. Methods used in judging at county and state fairs will be followed in presenting the course. Special attention will be given to the selection of foundation stock for purebred herds.

DAIRY HUSBANDRY

1. DAIRYING I. First year. Class work, two hours; laboratory, four hours. Four credits. Professor Reed, Associate Professor Fitch, Mr. Olson, Mr. Tomson and Mr. Fairchild.

A general course in farm dairying, consisting of lectures and laboratory work on the secretion, composition, and properties of milk; the effect of the period of lactation; the Babcock test; the farm separator; farm butter making, and dairy sanitation; the handling of milk, feeding the dairy cow, and selecting and breeding the dairy herd.

3. DAIRYING II. Class work, three hours; laboratory, four hours. Five credits. Associate Professor Fitch.

Instruction is given in keeping records and accounts of dairy-farm business; in building up a dairy herd; concerning buildings on a dairy farm; concerning silos and silage; on the fertility account of the dairy; on cow-testing associations; the coöperative ownership of dairy sires, and the making of detailed plans for the management of the dairy farm.

Laboratory.—In the laboratory dairy stock is judged from the standpoint of economical production and breed type. Score cards are used for the purpose of training the student to become accurate, thorough and systematic in the selection of dairy animals.

5. CREAMERY MANAGEMENT. Class work, two hours. Two credits. Mr. Olson.

This course includes the advisability of starting a creamery, forms of organizations (copartnership, corporation, coöperative and joint-stock companies), creamery construction, sewage disposal, refrigeration, labor, purchase of milk and cream, the purchase of equipment and supplies. Also the overrun and manufacturing losses, cost of power (steam, gas, kerosene and motor), pasteurization costs, marketing, advertising, salesmanship, business correspondence, credits and collections and bookkeeping. No text.

7. CREAMERY BUTTER MAKING. Class work, four hours; laboratory, eight hours. Eight credits. Mr. Olson.

Lectures are given on the sampling, weighing and grading of cream and milk; on natural and commercial starters; on the pasteurization of milk and cream; on cream ripening and the churning, washing, salting, packing and marketing of butter; on conditions controlling the per cent of moisture in butter, etc. The laboratory work comprises practice in sampling, weighing and grading milk and cream, and in churning, packing, and marketing butter; the study of different makes of churns; the pasteurization of cream, and practice with starters.

9. CHEESE AND ICE-CREAM MAKING. Class work, one hour; laboratory, six hours. Four credits. Mr. Tomson.

This course deals with the making of cheese on the farm for home use and for sale. All the common types of cheese are made. The last half of the term is devoted to the study of ice-cream making, including proportion of cream, flavoring, fillers, freezing, packing, and storing ice-cream. Practice is given in the making of cheese, ice cream, and ices, for home use, and on a commercial scale. The student judges cheese and prepares cream; flavors, freezes, and packs ice cream.

11. MARKET MILK. Class work, two hours. Two credits. Mr. Olson. This course is a study of the methods of managing the handling of milk in a city milk plant.

13. JUDGING DAIRY PRODUCTS. Laboratory, two hours. One credit. Mr. Olson.

This course comprises scoring and judging butter, cheese, milk and ice cream. It is laboratory work supplemented by occasional lectures.

HORTICULTURE

1. FARM HORTICULTURE. First year. Class work, two hours; laboratory, two hours. Three credits. Professor Dickens and Assistant Calvert.

The purpose of this course is to acquaint the student with those horticultural principles and practices which are concerned in making the farm a better place for a home. The planning of the farmstead and the improvement of its appearance by the use of trees, shrubs and flowers is first considered. The possibilities of the vegetable garden, the fruit garden and the orchard in furnishing a more varied and more healthful diet for the farm home, and the means of securing these products, are among the subjects considered. The economic consideration of the cost of production and methods of handling and marketing products are briefly discussed.

2. FRUIT GROWING. Elective. Class work, three hours; laboratory, four hours. Five credits. Assistant Professor Merrill.

This course considers the possibilities of fruit growing on a commercial scale and for the home orchard. The subjects studied are: types of soil adapted to fruit growing, location of orchard as regards sites and drainage, interplanting and cropping, pruning, harvesting and marketing of the crops.

The laboratory work offers practical experience in the different branches of orchard practice.

5. SPRAYING. Elective. Class work, one hour; laboratory, two hours. Two credits. Assistant Professor Merrill.

The lectures comprise general studies of the most valuable fungicides and insecticides; their relative costs and their values for controlling the different types of fungus diseases and insects. Spraying schedules are discussed for the various types of fruits and vegetables, including the dates of application, materials used and the pests controlled.

The laboratory work consists of demonstrations and practice in preparing, making and testing the most important spraying materials. General studies of nozzles and spraying machinery are also made.

POULTRY HUSBANDRY

1. GENERAL POULTRY LECTURES. First year. Class work, one hour. One credit. Professor Lippincott and Mr. Fox.

The lectures given in this course put special emphasis on the subjects of poultry management which are of greatest importance to the student in making more from his farm poultry.

2. INCUBATION AND BROODING. Elective. Three times a day for a period of not less than seven weeks. Three credits. Prerequisite: Poultry Husbandry I. Mr. Fox.

The student will have an opportunity to operate incubators and care for chicks with brooders.

4. POULTRY MARKETING. Elective. Laboratory, two hours. One credit. Prerequisite: Poultry Husbandry I. Mr. Fox.

This course gives the student practice in candling and grading eggs and in killing, picking, cooling, and packing poultry for market.

ADDITIONAL SUBJECTS

BLACKSMITHING I. (Shop 1.) Elective. Laboratory, four hours. Two credits. Mr. Lynch and Mr. Bundy.

A beginning course in forging operations, including drawing, upsetting, bending, twisting, hot and cold punching, welding, together with instructions in the use of the fire and the selection and care of tools. The exercises given are such as to be of practical value to the man on the farm.

BLACKSMITHING II. (Shop 2.) Elective. Laboratory, four hours. Two credits. Prerequisite: Shop 1. Mr. Lynch and Mr. Bundy.

A continuation of Blacksmithing I with additional exercises in iron and machine steel. Some practice is given in hardening and tempering tool steel, and in making some of the tools used in the shop. Some practice is also given in plow work.

CARPENTRY I. (Shop 20.) Elective. Laboratory, four hours. Two credits. Mr. Parker and Mr. Ball.

A practical course in woodworking to give an understanding of the proper use and care of tools and material. The work includes making tool boxes, singletrees, doubletrees, feed boxes, wheel-barrows, porch swings and other practical work. All work is done from blue prints and drawings.

CARPENTRY II. (Shop 21.) Elective. Laboratory, four hours. Two credits. Prerequisite: Shop 20. Mr. Parker and Mr. Ball.

A continuation of Carpentry I. Considerable work with paints, varnishes and wood finishes is provided. Some practice is given with the square as used in cutting rafters and framing and other operations especially useful on the farm.

CONCRETE CONSTRUCTION. (Applied Mechanics 20.) Elective. Class work, two hours. Two credits. Assistant Professor Wendt.

Instruction is given in the principles governing the selection and preparation of materials, the proper proportioning of materials for different conditions, the construction of forms, mixing and handling concrete, elementary reinforced concrete construction, finishing concrete surfaces, stucco and plaster work, and the water-proofing and coloring of concrete. A brief study is made of the application of these principles to the making of concrete building blocks and bricks, fence posts, sidewalks, floors, tanks, cisterns, silos and bridges and culverts. Text: Seaton's *Concrete Construction for Rural Communities*.

CONCRETE CONSTRUCTION LABORATORY. (Applied Mechanics 21.) Elective. Laboratory, four hours. Two credits. Must be taken with Applied Mechanics 20. Assistant Professor Wendt and assistants.

Laboratory and field work is given in hand and machine mixing and handling of concrete, and in the construction of forms for such objects as machine and building foundations, floors, sidewalks, fence posts and building blocks. Tests are made on concrete cylinders and beams to illustrate the effect of different methods of treatment on the strength and reliability of plain and reinforced concrete.

DAIRY BACTERIOLOGY. (Bacteriology 1.) Elective. Class work, two hours. Two credits. Assistant Professor Hunter.

This course is designed for students who have had no training in chemistry and biology and is a general study of the bacteriology of milk and milk products. Bacterial contaminations of milk from air, water, utensils, the cow, the milker, etc., are discussed. Normal and abnormal fermentations, their significance and control in milk, butter, cheese, and special dairy products are considered.

DAIRY MECHANICS AND REFRIGERATION. (Steam and Gas 25.) Laboratory, four hours. Two credits. Assistant Professor Simmering.

A study of the compression systems of refrigeration; also operation, care and repair of refrigerating machinery and auxiliaries.

PRACTICAL ELECTRICITY. (Electrical Engineering 1.) Elective. Class work, two hours. Two credits. Mr. Biorkman.

An elementary course in the practical application of electricity to the electrical machines and apparatus which are now to be found in the small isolated plant, the rural or small town house and store, the electrical equipment of automobiles (with the exception of the ignition) and other electrical devices concerning which the general public now should be informed.

This course will treat of the care and operation of dynamos, motors and generators, of storage batteries, lead and nickel iron or Edison types, for both stationary and portable use; of the proper methods of wiring houses and other buildings, and the different classes of approved material for this purpose; methods of outside wiring between buildings; and general uses of electric light and power.

FARM INSECTS. (Entomology 1.) Elective. Class work, three hours. Three credits. Assistant Professor Tanquary.

The more important insects of the farm, garden and orchard are discussed, together with the best means of control. In this course the in-

structor will endeavor to show the student that clean culture and good farm methods are very effective in the control of many of the serious insect pests. Many of the lectures will be illustrated with lantern slides.

BEEKEEPING. (Entomology 10.) Elective. Class work, two hours; laboratory, two hours. Three credits. Assistant Professor Merrill.

This course gives a general survey of the subject of beekeeping, with a general consideration of the elements of practical beekeeping. The subjects which will be considered are: Life history, behavior and instincts of the honey bee, products of the apiary, and relation of bees to crop production. A study will be made of the various bee diseases, together with their treatment. The laboratory exercises are to consist of practice in constructing the hives, supers, brood frames, comb-honey sections, extracting frames, wiring frames, and putting in and embedding foundation. Demonstrations are given of various methods of transferring bees, manipulating colonies for swarm prevention and making increase, treatment of brood diseases, and methods for wintering. The object of this course is to give such practical experience as will help a person to engage successfully in beekeeping.

FARM MACHINERY. (Farm Machinery 1.) Elective. Laboratory, two hours. One credit. Instructor Wiseman.

There is a great waste on farms from lack of knowledge of the kind of machinery to use and the way to care for it. The purpose of this course is to acquaint the student with the factors underlying wise selection and proper care of farm machines, as well as with methods of operation of a number of important machines. Some practical instruction is given in rope work. Fences and the farm power plant are studied. The work is given in the form of lectures and laboratory demonstrations.

POWER FARMING MACHINERY. (Farm Machinery 2.) Elective. Laboratory, four hours. Two credits. Assistant Professor Wirt.

This course takes up the study of those machines that are used with the tractor, including the engine plows, feed-mills, corn shellers, hay balers, ensilage cutters, husker-shredders, and threshing machines.

LIVESTOCK SANITATION. (Veterinary Medicine I.) Elective. Class work, three hours. Three credits. Doctor Patterson.

This subject deals with diseases that are communicable from animal to animal or from animal to man. The causes, symptoms and methods that are employed to prevent and to combat the spread of diseases, and the drugs that are commonly used as disinfectants, for washes, dips, etc., are given full consideration. The use of serums, vaccines, etc., for the prevention of diseases is considered. Methods of disposal of sick and dead animals as well as the means employed to clean and to disinfect the premises so as to prevent a recurrence of diseases are considered.

PHYSICAL TRAINING. (Physical Education 1.) Elective. Two hours. One credit. Professor Clevenger and Mr. Bauer.

This course includes elementary free-hand calisthenics; elementary light-hand apparatus, including wands and dumb-bells, and elementary heavy apparatus work. Almost one-half of the time is devoted to the playing of games. A shower bath is a part of the work of each class period, each member of the class also being regularly given the opportunity of taking a plunge and swim in the large gymnasium pool.

SPECIAL LECTURES. Elective. One hour a week. One credit.

At least once each week during the eight weeks of the short course special lectures on subjects of timely interest are given by persons connected with the College or well known as agricultural leaders.

GAS ENGINES. (Steam and Gas 1 and 2.) Elective. Class work, one hour; laboratory, four hours. Three credits. Mr. Collins, Mr. Buck, Mr. Hobbs, and student assistants.

A study of gasoline and kerosene engines; four-stroke and two-stroke cycle engines, gas-engine fuels, carburetors, ignition systems, lubrication, governing; selection, erection and operation of stationary gasoline and kerosene engines; fundamental parts of automobiles.

GAS ENGINES AND AUTOMOBILES. (Steam and Gas 6.) Elective. Laboratory, four hours. Prerequisites: Steam and Gas 1 and 2. Mr. Collins and assistants.

A study of gas engines and automobiles, with particular reference to ignition systems, carburetors, transmissions, lubricating systems and automobile auxiliaries.

TRACTION ENGINES. (Steam and Gas 16.) Elective. Laboratory, four hours. Two credits. Mr. Sanders, Mr. Collins, Mr. Buck, and assistants.

A study of gas traction engines or of steam traction engines, including care and operation of various types.

Course in Testing Dairy Products

This course is offered to those who are buying milk or cream and who wish to gain, in a short time, skill and accuracy in the application of the various tests necessary in such work. The law of the State requires that all persons buying milk or cream by test must pass a satisfactory examination and secure a certificate from the State Dairy Commissioner. This course is designed to meet the needs of those who find they have not sufficient knowledge of the subject to pass such an examination.

In addition to a study of the Babcock test, the student receives lectures on ordinary sanitation, and learns the methods necessary to keep his place of business in a sanitary condition. Exercises are given in grading milk and cream, and in methods of handling cream so as to keep it in condition until used or delivered at the railway station. This course is offered at different periods throughout the year, dates being announced a few days previous to the opening of each period.

Agriculture in the Summer School

At the present time the greatest hindrance to the general introduction of agriculture into the high schools and grade schools of the State is a lack of properly prepared teachers. In order to give the teachers of the State an opportunity to fit themselves to introduce this subject successfully into their schools, the College offers summer courses in agriculture, in which especial emphasis is laid upon the subject matter and methods adapted to secondary and elementary schools.

The work offered consists in part of some of the regular subjects of the College courses, including a thorough study of farm crops and soils, and extensive practice in judging beef cattle, dairy cattle, sheep and swine. Practical courses are also available in the principles of live-

stock feeding, farm dairying, fruit growing, landscape gardening, poultry production, practice in incubation and brooding, poultry judging and diseases of farm animals. In addition to these regular College courses, special classes are organized to meet the needs of teachers of agriculture in grade schools, rural schools and high schools. These courses include elementary agriculture, school gardening, methods of teaching agriculture in high schools, teachers' course in animal husbandry and a seminar in agriculture especially provided for all teachers of agriculture in high schools.

Brief information regarding these courses in the Summer School may be found in the department write-ups in this catalogue. For further information write to the Director of the Summer School.

Division of Mechanic Arts

ANDREY ABRAHAM POTTER, *Dean.*

The Division of Mechanic Arts offers curricula in agricultural engineering, architecture, civil engineering, electrical engineering, flour-mill engineering, and mechanical engineering, each leading to the degree of bachelor of science in the profession selected.

The work of the freshman year is the same in all curricula of the division except that in architecture, in which a minor change is made. Electrical and mechanical engineering students take the same work in the sophomore year, and various courses are common to two or more curricula in each of the four years.

While the curricula, as offered, are believed to be sufficient to cover the needs of the average young man, it is possible to combine portions of the work of two or more of them in such a way that one may be prepared to take up a special line of work for which he desires to fit himself. For example, by substituting certain courses from the departments of chemistry and geology for some of those in the course in mechanical engineering a young man can fit himself for work in connection with the manufacture of cement. By substituting some of the courses in chemistry for others in mechanical engineering, a special preparation can be secured for chemical engineering. By combining some of the courses in civil and mechanical engineering and by taking additional work in chemistry and geology a young man may fit himself for special work in connection with the development of the coal fields of the country. By combining courses in architecture and civil engineering, specialization in architectural engineering may be secured. In special cases permission will be granted to combine the work on the lines here indicated. With the permission of the dean of the division, students desiring to do so may substitute work in military engineering for certain subjects in any of the courses of the division.

It is believed that the curricula as tabulated give the best preparation for students expecting to follow general work in the profession selected, and for those who are not certain what branch of their profession they will follow. The substitutions and combinations indicated, and others similar to them, will be permitted only when there is good evidence that the student desiring such work is practically certain to follow the branch selected.

In the case of any of these modifications, the degree granted will be that of the course in which the major portion of the work is taken. In no case will the substitution of an additional amount of technical work for any of the general cultural work in the course be allowed.

Besides the four-year professional curricula, the Division of Mechanic Arts offers:

A three-year curriculum in mechanic arts in the School of Agriculture, with trade practice electives in blacksmithing, carpentry, concrete construction and stationary and traction engines, and

Short winter courses of eight weeks each in road building, irrigation and drainage, in shop work, and in steam and gas traction engines.

These are all discussed elsewhere in this catalogue.

CURRICULUM IN AGRICULTURAL ENGINEERING

The curriculum in agricultural engineering is designed to qualify men for engineering work in rural communities; for positions in the farm-machinery and farm-motor industry; for the management of farms where drainage, irrigation or power-farming methods are prevalent; and for the positions of advisors, consulting engineers or architects in connection with farm buildings and equipment.

The work of the first year is the same as in the other engineering curricula. During the last three years about one-third of the time is devoted to agricultural subjects, in order to familiarize the students with the modern methods of scientific agriculture and to enable them to apply engineering principles to agricultural problems in a practical way. Considerable time is also devoted to farm machinery, farm motors, rural architecture, highway engineering, irrigation, drainage, and concrete construction.

The agricultural engineering students are also given considerable training in drawing, machine design, shop practice, physics, chemistry, surveying, steam engineering, gas engineering, and electrical engineering.

CURRICULUM IN ARCHITECTURE

The curriculum in architecture was organized to train men in the general field of architecture, and also to relate the principles of architecture to farm buildings and grounds. The rapid increase in wealth in the State creates a demand for designers and builders of every type.

The freshman year of this curriculum is nearly identical with that of the other courses of the Division of Mechanic Arts. The other three years are devoted to the study of pure and applied mathematics, mechanics, physics, history of architecture, municipal improvements, modern steel and concrete construction, drawing and design, and rural landscape architecture. The instruction is planned to develop the creative powers of the student in the fields of original composition. From nine to fifteen hours a week, for the last three years, are given to work of this kind over the drawing table.

The College is well equipped for the maintenance of a curriculum in architecture. It owns a collection of several hundred plaster casts, tile and terra cotta samples, marble specimens, etc. It has a fine collection of models of the classic orders; a collection of blue-prints of residences, schoolhouses and churches, and of nearly all the Kansas state buildings; a large number of modern books on architecture and engineering; a complete set of the international edition of the *American Architect*; a complete set of the *Inland Architect*, and sets of several European architect-

tural magazines; a well-equipped blue-print room, etc. The substantial stone buildings of the institution, their complete system of water-supply, drainage, heating and lighting, and one of the largest and handsomest campuses in America, furnish excellent illustrative material.

Students taking the courses in architecture are expected to devote their summer vacations to practical work in actual building operations.

CURRICULUM IN CIVIL ENGINEERING

The aim of the curriculum in civil engineering, as outlined in the catalogue, is to give to the young men taking the work the best possible preparation for entering upon the active practice of the profession under present conditions. It will be noted that the first and second years are devoted almost entirely to general culture studies and the sciences, including mathematics. This follows the arrangement generally found in the engineering curricula of American colleges, and it finds its justification in the well-nigh universally accepted idea that any engineering education worthy of consideration must be grounded upon ample preliminary education in the allied sciences. In recognition of the mechanical trend of the age, liberal provision is made for class and laboratory work in mechanical and electrical engineering.

In view of the growing importance of municipal problems, such as paving, sewerage and water-supply, the curriculum in civil engineering includes required courses in these subjects.

Advanced elective courses in railroad, highway, and irrigation and drainage engineering are offered in the second semester of the senior year.

CURRICULUM IN ELECTRICAL ENGINEERING

The essential elements underlying a sound engineering training are based upon a thorough study of mathematics and the physical sciences. The professional work of this curriculum begins in the junior year and continues throughout the last two years. General culture subjects are included in the work of each of the four years.

Emphasis is placed upon training to deal with forces and matter according to scientific principles, rather than upon the accumulation of facts. The department laboratories are well equipped with the various measuring instruments, standardizing apparatus, and the different types of dynamo machinery. The different subjects are presented in the classroom, and the classroom work is supplemented by laboratory practice. The curriculum provides a liberal training in wood- and iron-working, mechanical drawing, and machine-shop practice.

The laboratory experiments selected for the students are designed to give a clear conception of the theoretical work of the classroom.

Students are given extensive practice in connecting up the different types of machines for testing purposes and for standard commercial work. This practice work and testing extends throughout the junior and senior years, and is intended to give the student familiarity with the underlying principles of the different machines, and a knowledge of the

care necessary to operate them successfully. Opportunity is also given to undertake the investigation of commercial problems as they are sent to the College from the different central stations of the State.

CURRICULUM IN FLOUR-MILL ENGINEERING

The milling of wheat and other cereals is an important industry in this State. The curriculum in flour-mill engineering is designed to prepare men for the management of mills, for work in connection with the designing of milling plants, and for research work in the preparation and utilization of mill products.

The work of the freshman year is the same as in the other engineering courses. The sophomore year is similar to that of the mechanical engineering course, but includes additional chemistry and a beginning course in milling practice. In the junior and senior years, besides the courses dealing with the production, marketing, testing and milling of grain products, a considerable amount of time is devoted to mechanics, chemistry, history, economics, business law and organization, steam and gas engineering and flour mill design.

CURRICULUM IN MECHANICAL ENGINEERING

The work in mechanical engineering prepares for the successful management and superintendence of factories and power plants; for the design of power and machinery installation; for the design and construction of machine tools, steam and gas engines, compressors, hydraulic machinery, etc.; and for the design and erection of engineering buildings and factories, including the selection, purchasing and location of the equipment.

The curriculum has been laid out with the aim of securing a judicious mixture of theory and practice, such as will not only give the student the technical skill required for engineering operations, but will also endow him with an understanding of the scientific and economic principles necessary for the solution of engineering and industrial problems.

Throughout the four years the theoretical studies in the classroom are supplemented by the practical work in the laboratories in such a manner as very materially to strengthen both. In the materials and machinery testing laboratories the work does not end when the test is completed, but the entire problem must be written up in such a manner as would be approved in the best commercial testing laboratories. The laboratory work in the shops not only gives the student practice in performing the machining and various other mechanical operations, but includes a scientific study of the factors of production, so that the loss of material and the expenditure of human effort will be a minimum.

Students pursuing a mechanical engineering course are urged to spend at least two summers in some shop or commercial plant in order to broaden their training.

Curriculum in Agricultural Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
Chemistry I Chem. 101 5(3-4, 2)	Chemistry II Chem. 102 5(3-4, 2)
Plane Trigonometry Math. 101 3(3-0)	Plane Analytical Geometry Math. 110 4(4-0)
College Algebra Math. 104 3(3-0)	
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
General Drawing Arch. 101 1(0-3)	Descriptive Geometry Arch. 104, 107..... 3(1-6)
<div style="display: inline-block; vertical-align: middle;"> { Woodwork Shop 101 1(0-3) Forging I Shop 150 1(0-3) } </div> or	
Surveying I C. E. 101, 105..... 2(1-3)	Surveying I C. E. 101, 105..... 2(1-3) or
	<div style="display: inline-block; vertical-align: middle;"> { Woodwork Shop 101 1(0-3) Forging I Shop 150 1(0-3) } </div>
Military Science I Mil. Tr. 101..... 1(0-3)	Military Science II Mil. Tr. 102..... 1(0-3)
Engineering Lectures Steam and Gas 190..... R	Engineering Lectures Steam and Gas 190..... R
Hygiene and Social Problems M Phys. Ed. 125 R	

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Engineering Physics I Physics 211 5(4-3)	Engineering Physics II Physics 212 5(4-3)
Calculus I Math. 113 5(5-0)	Calculus II Math. 116 3(3-0)
Surveying II C. E. 110, 115..... 3(2-3) or	Farm Crops Agron. 103 4(3-3)
Organic Chemistry Chem. 120 3(2-2, 1)	Farm Field Machinery Farm Mach. 101, 105... 3(2-3)
Mechanical Drawing I Ap. Mech. 160, 165.... 2(1-3)	Metallurgy Shop 165 2(2-0) or
Foundry Practice Shop 160 1(0-3)	Quantitative Analysis I Chem. 150 2(0-6)
Forging II Shop 155 1(0-3)	Pattern Making Shop 145 1(0-3)
Military Science III Mil. Tr. 103..... 1(0-3)	Military Science IV Mil. Tr. 104..... 1(0-3)
Seminar Shop 190 or C. E. 165..... B	Seminar Shop 190 or C. E. 165..... R

AGRICULTURAL ENGINEERING—*continued*

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Applied Mechanics I Ap. Mech. 101, 105.... 4(3-3)	Applied Mechanics E-II Ap. Mech. 115, 120.... 4(3-3)
American Industrial History Hist. 105 3(3-0)	Economics Econ. 101 3(3-0)
Soils Agron. 131 4(3-3)	Power Farming Machinery Farm Mach. 110..... 2(0-6)
Farm Motors I Steam and Gas 140, 145, 3(2-3)	Kinematics Ap. Mech. 180..... 3(3-0)
Types and Classes of Live Stock An. Husb. 101..... 3(1-6)	Farm Motors II Steam and Gas 150, 155, 3(2-3) <i>or</i>
	Mechanical Drawing II Ap. Mech. 170..... 3(0-9) <i>or</i>
	Hydraulics Ap. Mech. 130, 135..... 4(3-3)
	Machine Tool Work I Shop 170 2(0-6)
Seminar Shop 190 <i>or</i> C. E. 165..... R	Seminar Shop 190 <i>or</i> C. E. 165..... R

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Farm Management Agron. 261 3(2-3)	Drainage and Irrigation I C. E. 160..... 3(3-0)
Extempore Speech I Pub. Sp. 201..... 2(2-0)	Engineering English Engl. 110 2(2-0)
Principles of Feeding An. Husb. 104..... 3(3-0)	Electrical Engineering C Elect. Engr. 160, 165... 3(2-2, 1)
Rural Architecture Arch. 194, 195..... 3(1-6)	Concrete Construction Ap. Mech. 140, 145.... 2(1-3)
Highway Engineering I C. E. 230 and Ap. Mech. 250 3(2-3)	Steam and Gas Engineering C Steam and Gas 120, 125, 3(2-3)
Business Law I Hist. 153 1(1-0)	Business Organization Econ. 204 1(1-0)
Advanced Farm Machinery Farm Mach. 201..... 2(0-6)	Elements of Dairying Dairy Husb. 101..... 3(2-3) <i>or</i>
	Soil Fertility Agron. 132 3(2-3)
Seminar Shop 190 <i>or</i> C. E. 165..... R	Seminar Shop 190 <i>or</i> C. E. 165..... R
Thesis Ap. Mech. 150, C. E. 170, Farm Mach. 175, Shop 195, <i>or</i> Steam and Gas 195 R	Thesis Ap. Mech. 150, C. E. 170, Farm Mach. 175, Shop 195, <i>or</i> Steam and Gas 195 R

Curriculum in Architecture

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
Chemistry I Chem. 101 5(3-4, 2)	Chemistry II Chem. 102 5(3-4, 2)
Plane Trigonometry Math. 101 3(3-0)	Plane Analytical Geometry Math. 110 4(4-0)
College Algebra Math. 104 3(3-0)	Descriptive Geometry Arch. 104, 107 3(1-6)
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
General Drawing Arch. 101 1(0-3)	Architectural Drawing I Arch. 110 2(0-6)
Woodwork Shop 101 1(0-3)	
Forging I Shop 150 1(0-3)	
Military Science I Mil. Tr. 101 1(0-3)	Military Science II Mil. Tr. 102 1(0-3)
Engineering Lectures Steam and Gas 190 R	Engineering Lectures Steam and Gas 190 R
Hygiene and Social Problems M Phys. Ed. 125 R	

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Engineering Physics I Physics 211 5(4-3)	Engineering Physics II Physics 212 5(4-3)
Calculus I Math. 113 5(5-0)	American Industrial History Hist. 105 3(3-0)
Residences Arch. 119 3(3-0)	Color and Ornament Arch. 137 3(3-0)
Arch. Drawing II Arch. 113 2(0-6)	Architectural Composition I Arch. 122 3(0-9)
Shades and Shadows Arch. 116 1(0-3)	Linear Perspective Arch. 134 1(0-3)
Foundry Practice Shop 160 1(0-3)	Surveying I C. E. 101, 105 2(1-3)
Military Science III Mil. Tr. 103 1(0-3)	Military Science IV Mil. Tr. 104 1(0-3)
Seminar Arch. 176 R	Seminar Arch. 176 R

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
History of Architecture I Arch. 140 3(3-0)	History of Architecture II Arch. 143 3(3-0)
Applied Mechanics I Ap. Mech. 101, 105 4(3-3)	Materials of Construction Arch. 146, 149 5(3-6)
Extempore Speech I Pub. Sp. 201 2(2-0)	Economics Econ. 101 3(3-0)
Sanitary Biology Bact. 140 2(2-0)	Clay Modeling Arch. 152 2(0-6)
Advanced Woodwork Shop 140 2(0-6)	
Architectural Composition II Arch. 125 3(0-9)	Architectural Composition III Arch. 128 3(0-9)
Graphic Statics Ap. Mech. 125 1(0-3)	Ink Rendering Arch. 155 1(0-3)
Seminar Arch. 176 R	Seminar Arch. 176 R

ARCHITECTURE—continued

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Engineering Geology Geol. 102 4(2-6)	Illuminating Engineering Elect. Engr. 235..... 2(2-0)
Trusses Arch. 161, 164..... 4(2-6)	Engineering English Engl. 110 2(2-0)
Business Law I Hist. 153 1(1-0)	Business Organization Econ. 204 1(1-0)
Specifications Arch. 167 2(2-0)	Municipal Engineering Arch. 170 2(2-0)
Color Rendering Arch. 158 1(0-3)	Heating and Ventilation A Steam and Gas 180..... 2(2-0)
Architectural Composition IV Arch. 131 3(0-9)	City and Town Planning Hort. 237 3(1-6)
Concrete Construction Ap. Mech. 140, 145.... 2(1-3)	Landscape Design Arch. 173 2(0-6)
Seminar Arch. 176 R	Seminar Arch. 176 R
Thesis Arch. 179 R	Thesis Arch. 179 R

Curriculum in Civil Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
Chemistry I Chem. 101 5(3-4, 2)	Chemistry II Chem. 102 5(3-4, 2)
Plane Trigonometry Math. 101 3(3-0)	Plane Analytical Geometry Math. 110 4(4-0)
College Algebra Math. 104 3(3-0)	
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
General Drawing Arch. 101 1(0-3)	Descriptive Geometry Arch. 104, 107..... 3(1-6)
<div style="display: inline-block; vertical-align: middle;"> { Woodwork Shop 101 1(0-3) Forging I Shop 150 1(0-3) Surveying I C. E. 101, 105..... 2(1-3) </div> <div style="display: inline-block; vertical-align: middle; margin-left: 10px;"> } or </div>	<div style="display: inline-block; vertical-align: middle;"> Surveying I C. E. 101, 105..... 2(1-3) or { Woodwork Shop 101 1(0-3) Forging I Shop 150 1(0-3) Military Science II Mil. Tr. 102..... 1(0-3) </div> <div style="display: inline-block; vertical-align: middle; margin-left: 10px;"> } </div>
Military Science I Mil. Tr. 101..... 1(0-3)	Engineering Lectures Steam and Gas 190..... R
Engineering Lectures Steam and Gas 190..... R	
Hygiene and Social Problems M Phys. Ed. 125..... R	

CIVIL ENGINEERING—continued

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Engineering Physics I Physics 211 5(4-3)	Engineering Physics II Physics 212 5(4-3)
Calculus I Math. 113 5(5-0)	Calculus II Math. 116 3(3-0)
Surveying II C. E. 110, 115..... 3(2-3)	Masonry and Foundations C. E. 120..... 2(2-0)
Extempore Speech I Pub. Sp. 201..... 2(2-0)	American Industrial History Hist. 105 3(3-0)
Mechanical Drawing I Ap. Mech. 160, 165.... 2(1-3)	Metallurgy Shop 165 2(2-0)
Military Science III Mil. Tr. 103..... 1(0-3)	Civil Engineering Drawing I C. E. 125..... 2(0-6)
Seminar C. E. 165..... R	Military Science IV Mil. Tr. 104..... 1(0-3)
	Seminar C. E. 165..... R

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Applied Mechanics I Ap. Mech. 101, 105.... 4(3-3)	Applied Mechanics II Ap. Mech. 110, 120.... 6(5-3)
Engineering Geology Geol. 102 4(2-6)	Hydraulics Ap. Mech. 130, 135.... 4(3-3)
Railway Engineering I C. E. 145..... 2(2-0)	Drainage and Irrigation I C. E. 160..... 3(3-0)
Surveying III C. E. 150, 155..... 3(2-3)	Steam and Gas Engineering C Steam and Gas 120, 125, 3(2-3)
Economics Econ. 101 3(3-0)	Business Organization Econ. 204 1(1-0)
Business Law I Hist. 153 1(1-0)	Seminar C. E. 165..... R
Seminar C. E. 165..... R	

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Bridge Stresses C. E. 201..... 4(4-0)	Bridge Design C. E. 240, 245..... 4(3-3)
Civil Engineering Drawing II C. E. 205..... 2(0-6)	Electrical Engineering C Elect. Engr. 160, 165... 3(2-2, 1)
Astronomy and Geodesy C. E. 210, 215..... 4(3-3)	Engineering English Engl. 110 2(2-0)
Water Supply C. E. 220..... 2(2-0)	Concrete Design C. E. 250, 255..... 3(2-3)
Sewerage C. E. 225..... 2(2-0)	Railway Engineering II C. E. 260, 265..... 4(2-6) or
Highway Engineering I C. E. 230 and Ap. Mech. 250 3(2-3)	Highway Engineering II C. E. 270, 275..... 4(2-6) or
	Drainage and Irrigation II C. E. 280, 285..... 4(2-6)
Seminar C. E. 165..... R	Seminar C. E. 165..... R
Thesis Ap. Mech. 150 or C. E. 170.. R	Thesis Ap. Mech. 150 or C. E. 170.. R

Curriculum in Electrical Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
Chemistry I Chem. 101 5(3-4, 2)	Chemistry II Chem. 102 5(3-4, 2)
Plane Trigonometry Math. 101 3(3-0)	Analytical Geometry Math. 110 4(4-0)
College Algebra Math. 104 3(3-0)	
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
General Drawing Arch. 101 1(0-3)	
{ Woodwork Shop 101 1(0-3) }	{ Woodwork Shop 101 1(0-3) }
{ Forging I Shop 150 1(0-3) }	{ Forging I Shop 150 1(0-3) }
	Descriptive Geometry Arch. 104, 107 3(1-6)
Surveying I C. E. 101, 105 2(1-3)	Surveying I C. E. 101, 105 2(1-3) or
Military Science I Mil. Tr. 101 1(0-3)	Military Science II Mil. Tr. 102 1(0-3)
Engineering Lectures Steam and Gas 190 R	Engineering Lectures Steam and Gas 190 R
Hygiene and Social Problems M Phys. Ed. 125 R	

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Engineering Physics I Physics 211 5(4-3)	Engineering Physics II Physics 212 5(4-3)
Calculus I Math. 113 5(5-0)	Calculus II Math. 116 3(3-0)
Kinematics Ap. Mech. 180 3(3-0)	American Industrial History Hist. 105 3(3-0)
Mechanical Drawing I Ap. Mech. 160, 165 2(1-3)	Mechanical Drawing II Ap. Mech. 170 3(0-9)
Foundry Practice Shop 160 1(0-3)	Metallurgy Shop 165 2(2-0)
Forging II Shop 155 1(0-3)	Pattern Making Shop 145 1(0-3)
Military Science III Mil. Tr. 103 1(0-3)	Military Science IV Mil. Tr. 104 1(0-3)
Seminar Elect. Engr. 190 R	Seminar Elect. Engr. R

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Applied Mechanics I Ap. Mech. 101, 105 4(3-3)	Applied Mechanics E-II Ap. Mech. 115, 120 4(3-3)
Extempore Speech I Pub. Sp. 201 2(2-0)	Business Organization Econ. 204 1(1-0)
Economics Econ. 101 3(3-0)	Hydraulics Ap. Mech. 130, 135 4(3-3)
D. C. Machines I Elect. Engr. 101, 105... 4(3-2, 1)	D. C. Machines II Elect. Engr. 110, 115... 4(3-2, 1)
Instruments and Calibration Elect. Engr. 120, 125... 2(1-2, 1)	A. C. Machines I Elect. Engr. 201, 205... 3(2-2, 1)
Machine Tool Work I Shop 170 2(0-6)	Business Law I Hist. 153 1(1-0)
Seminar Elect. Engr. 190 R	Seminar Elect. Engr. 190 R

ELECTRICAL ENGINEERING—continued

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Steam and Gas Engineering I Steam and Gas 101, 105, 5(4-3)	Steam and Gas Engineering II Steam and Gas 110, 115, 4(3-3)
A. C. Machines II Elect. Engr. 210, 215... 6(4-4, 2)	Generation and Distribution Elect. Engr. 230..... 3(3-0)
Electrical Machine Design I Elect. Engr. 150..... 1(0-3)	Electrical Machine Design II Elect. Engr. 155..... 2(0-6)
Telephony Elect. Engr. 220, 225... 3(2-3)	Illuminating Engineering Elect. Engr. 235..... 2(2-0)
Factory Engineering Shop 245, 250..... 2(1-3)	Electric Railways Elect. Engr. 240..... 2(2-0)
	Engineering English Engl. 110 2(2-0)
Seminar Elect. Engr. 190..... R	Seminar Elect. Engr. 190..... R
Thesis Elect. Engr. 195..... R	Thesis Elect. Engr. 195..... R

Curriculum in Flour-mill Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
Chemistry I Chem. 101 5(3-4, 2)	Chemistry II Chem. 102 5(3-4, 2)
Plane Trigonometry Math. 101 3(3-0)	Plane Analytical Geometry Math. 110 4(4-0)
College Algebra Math. 104 3(3-0)	
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
General Drawing Arch. 101 1(0-3)	Descriptive Geometry Arch. 104, 107..... 3(1-6)
{ Woodwork Shop 101 1(0-3) }	
{ Forging I Shop 150 1(0-3) }	
Surveying I C. E. 101, 105..... 2(1-3)	Surveying I C. E. 101, 105..... 2(1-3) or
	{ Woodwork Shop 101 1(0-3) }
	{ Forging I Shop 150 1(0-3) }
Military Science I Mil. Tr. 101..... 1(0-3)	Military Science II Mil. Tr. 102..... 1(0-3)
Engineering Lectures Steam and Gas 190..... R	Engineering Lectures Steam and Gas 190..... R
Hygiene and Social Problems M Phys. Ed. 125..... R	

FLOUR-MILL ENGINEERING—*continued*

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Engineering Physics I Physics 211 5(4-3)	Engineering Physics II Physics 212 5(4-3)
Calculus I Math. 113 5(5-0)	Calculus II Math. 116 3(3-0)
	Extempore Speech I Pub. Sp. 201..... 2(2-0)
Organic Chemistry Chem. 120 3(2-2, 1)	Kinematics Ap. Mech. 180..... 3(3-0)
Mechanical Drawing I Ap. Mech. 160, 165.... 2(1-3)	Mechanical Drawing II Ap. Mech. 170..... 3(0-9)
Quantitative Analysis I Chem. 150 2(0-6)	Principles of Milling Mill. Ind. 101..... 1(0-3)
Military Science III Mil. Tr. 103..... 1(0-3)	Military Science IV Mil. Tr. 104..... 1(0-3)
Seminar Shop 190 R	Seminar Shop 190 R

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Applied Mechanics I Ap. Mech. 101, 105.... 4(3-3)	Applied Mechanics E-II Ap. Mech. 115, 120.... 4(3-3)
Advanced Quantitative Analysis Chem. 260 2(0-6)	Hydraulics Ap. Mech. 130, 135.... 4(3-3)
American Industrial History Hist. 105 3(3-0)	Economics Econ. 101 3(3-0)
Business Law I Hist. 153 1(1-0)	Grain Products Mill. Ind. 103..... 2(2-0)
Cereal Crop Production Agron. 201 3(2-3)	Milling Practice I Mill. Ind. 201..... 3(1-6)
Grain Marketing Mill. Ind. 102..... 3(3-0)	Milling Entomology Ent. 116 1(1-0)
Foundry Practice Shop 160 1(0-3)	
Seminar Shop 190 R	Seminar Shop 190 R

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Wheat and Flour Testing Mill. Ind. 203..... 4(1-9)	Experimental Baking A Mill. Ind. 204..... 2(0-6)
Flour Mill Design Ap. Mech. 215..... 3(0-9)	Milling Practice II Mill. Ind. 202..... 2(0-6)
Steam and Gas Engineering I Steam and Gas 101, 105, 5(4-3)	Steam and Gas Engineering II Steam and Gas 110, 115, 4(3-3)
Business Organization Econ. 204 1(1-0)	Refrigeration, Heating and Ventilation Steam and Gas 210, 215, 3(2-3)
Factory Engineering Shop 245, 250..... 2(1-3)	Electrical Engineering C Elect. Engr. 160, 165... 3(2-2, 1)
Machine Tool Work I Shop 170 2(0-6)	Engineering English Engl. 110 2(2-0)
Seminar Shop 190 R	Seminar Shop 190 R
Thesis Ap. Mech. 150, Shop 195, or Steam and Gas 195..... R	Thesis Ap. Mech. 150, Shop 195, or Steam and Gas 195..... R

Curriculum in Mechanical Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
Chemistry I Chem. 101 5(3-4, 2)	Chemistry II Chem. 102 5(3-4, 2)
Plane Trigonometry Math. 101 3(3-0)	Plane Analytical Geometry Math. 110 4(4-0)
College Algebra Math. 104 3(3-0)	
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
General Drawing Arch. 101 1(0-3)	Descriptive Geometry Arch. 104, 107 3(1-6)
<div style="display: inline-block; vertical-align: middle;"> { Woodwork Shop 101 1(0-3) Forging I Shop 150 1(0-3) } </div> or	<div style="display: inline-block; vertical-align: middle;"> { Woodwork Shop 101 1(0-3) Forging I Shop 150 1(0-3) } </div>
Surveying I C. E. 101, 105 2(1-3)	Surveying I C. E. 101, 105 2(1-3) or
Military Science I Mil. Tr. 101 1(0-3)	Military Science II Mil. Tr. 102 1(0-3)
Engineering Lectures Steam and Gas 190 R	Engineering Lectures Steam and Gas 190 R
Hygiene and Social Problems M Phys. Ed. 125 R	

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Engineering Physics I Physics 211 5(4-3)	Engineering Physics II Physics 212 5(4-3)
Calculus I Math. 113 5(5-0)	Calculus II Math. 116 3(3-0)
Kinematics Ap. Mech. 180 3(3-0)	American Industrial History Hist. 105 3(3-0)
Mechanical Drawing I Ap. Mech. 160, 165 2(1-3)	Mechanical Drawing II Ap. Mech. 170 3(0-9)
Foundry Practice Shop 160 1(0-3)	Metallurgy Shop 165 2(2-0)
Forging II Shop 155 1(0-3)	Pattern Making Shop 145 1(0-3)
Military Science III Mil. Tr. 103 1(0-3)	Military Science IV Mil. Tr. 104 1(0-3)
Seminar Shop 190 R	Seminar Shop 190 R

MECHANICAL ENGINEERING—continued

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Applied Mechanics I Ap. Mech. 101, 105..... 4(3-3)	Applied Mechanics II Ap. Mech. 110, 120..... 6(5-3)
Economics Econ. 101 3(3-0)	Hydraulics Ap. Mech. 130, 135.... 4(3-3)
Steam and Gas Engineering I Steam and Gas 101, 105, 5(4-3)	Steam and Gas Engineering II Steam and Gas 110, 115, 4(3-3)
Business Law I Hist. 153 1(1-0)	Business Organization Econ. 204 1(1-0)
Mechanical Drawing III Ap. Mech. 175..... 1(0-3)	
Graphic Statics Ap. Mech. 125..... 1(0-3)	
Mach. Tool Work I Shop 170 2(0-6)	Machine Tool Work II Shop 225 2(0-6)
Seminar Shop 190 R	Seminar Shop 190 R

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Electrical Engineering M-I Elect. Engr. 130, 135... 4(3-2, 1)	Electrical Engineering M-II Elect. Engr. 140, 145... 4(3-2, 1)
Power Plant Engineering Steam and Gas 201, 205, 5(3-6)	Refrigeration, Heating and Ventilation Steam and Gas 210, 215, 3(2-3)
Machine Design I Ap. Mech. 201, 205..... 5(3-6)	Machine Design II Ap. Mech. 210..... 2(0-6)
Factory Engineering Shop 245, 250..... 2(1-3)	Factory Design Shop 255 2(0-6)
Machine Tool Work III Shop 230 1(0-3)	Extempore Speech I Pub. Sp. 201..... 2(2-0)
	Engineering English Engl. 110 2(2-0)
Seminar Shop 190 R	Seminar Shop 190 R
Thesis Ap. Mech. 150, Shop 195, or Steam and Gas 195.... R	Thesis Ap. Mech. 150, Shop 195, or Steam and Gas 195.... R

Applied Mechanics and Machine Design

Professor SEATON
Assistant Professor WENDT
Assistant Professor PEARCE
Instructor ROBERT

The courses in applied mechanics are designed primarily to teach the graphical and analytical methods of determination of the forces acting on the parts of structures and machines, and of the effect of these forces on the parts. The courses are intended to be of a highly practical character. For the purpose of better fixing in the mind of the student the principles taught, the solution of a large number of problems involving these principles is required. The principles are further illustrated by means of the laboratory and drafting-room work, which parallels the classroom instruction. The textbooks in several of the courses are supplemented by notes and assigned reference work.

All laboratory tests of a commercial character are conducted in accordance with the standard methods prescribed by the national societies. Complete reports are required of the students on all laboratory exercises.

APPLIED MECHANICS LABORATORY

For testing the strength of materials this laboratory is provided with a 50,000-pound and a 100,000-pound Riehle universal testing machine, a 200,000-pound Olsen universal testing machine adapted for receiving columns up to 15 feet in height and beams up to 20 feet in length, a 250,000-inch-pound torsion testing machine, a 10,000-pound beam testing machine, and the auxiliary apparatus usually found in such laboratories.

This laboratory also contains transmission and absorption dynamometers, a scleroscope, extensometers, deflectometers, planimeters, micro-meters, jacks, hoists, scales, gauges and other small instruments for taking weights and measurements. A complete set of standard test weights ranging from one grain to 600 pounds total capacity is provided for the calibration of weighing apparatus. There is a full equipment of apparatus for making standard cement and concrete tests, two concrete building-block machines, and molds for various concrete products, such as drainage tile and fence posts.

The road-material laboratory contains an Olsen standard rattler for testing paving brick, a ball mill, a briquette former, impact machines, an abrasion machine, a hardness-testing machine, a diamond saw, a core drill, a complete set of apparatus for testing asphalt and other bituminous road materials, and the usual auxiliary apparatus.

HYDRAULICS LABORATORY

The hydraulics laboratory contains two hydraulic pits each of 25,000 gallons capacity, equipped with rectangular, triangular and trapezoidal weirs, an air-pressure tank, two hydraulic rams, two 4-inch volute centrifugal pumps, one 6-inch Hill-Tripp centrifugal pump, one 15-inch Layne and Bowler three-stage deep-well centrifugal pump, one positive rotary pump, one deep-well reciprocating pump, a water motor, a Pelton-Doble water wheel, a Trump water turbine, a small Price current meter, a Haskell current meter, electric motors for driving the pumps, and many pieces of small apparatus, such as an orifice tank, weirs, scales, tanks, hook gauges, pressure gauges, pressure regulators, water meters, including a 6-inch Venturi meter, and manometers.

COURSES IN APPLIED MECHANICS

FOR UNDERGRADUATES

101. **APPLIED MECHANICS I RECITATION.** Junior year, first semester and summer school. Class work, three hours. Three semester credits. Prerequisites: Calculus I (Math. 113) and Engineering Physics II (Physics 212). Professor Seaton, Assistant Professors Wendt and Pearce, and Mr. Robert.

A study is made of the composition, resolution and conditions of equilibrium of concurrent and nonconcurrent forces; center of gravity; laws of rectilinear and curvilinear motion of material points; moments of inertia; relations between forces acting on rigid bodies and the resulting motions; work energy and power; graphical solution of problems in statics. Text: Riggs' *Hancock's Applied Mechanics for Engineers*.

105. APPLIED MECHANICS I LABORATORY. Junior year, first semester and summer school. Laboratory work, three hours. One semester credit. Must accompany or follow Applied Mechanics. Recitation. Assistant Professor Wendt and Mr. Robert.

The calibration and use of laboratory measuring instruments and apparatus, such as micrometers, planimeters, dynamometers, platform scales, jacks, hoists and various types of testing machines. Text: Carpenter and Diederichs' *Experimental Engineering*. (This text is also used in the subsequent laboratory courses in applied mechanics and hydraulics, and also in steam and gas engineering.)

110. APPLIED MECHANICS II RECITATION. Junior year, second semester. Class work, five hours. Five semester credits. Prerequisite: Applied Mechanics I. Professor Seaton, Assistant Professors Wendt and Pearce, and Mr. Robert.

Behavior of materials subjected to tension, compression and shear; riveted joints; torsion; shafts, and the transmission of power; strength and stiffness of simple and continuous beams and cantilevers; bending moments and shear forces in beams; design of beams of wood, cast iron, steel and reinforced concrete; design of built-up beams and box girders; resilience of beams; stresses in columns and hooks; and the design of columns of wood, cast iron, steel, and reinforced concrete. Texts: Boyd's *Strength of Materials* and Hool's *Reinforced Concrete Construction*, Vol. I. *Cambria Steel* is used for reference.

115. APPLIED MECHANICS E-II RECITATION. Junior year, second semester. Class work, three hours. Three semester credits. Professor Seaton, Assistant Professors Wendt and Pearce, and Mr. Robert.

The subject matter of this course is very similar to that of Applied Mechanics II, but much less time is devoted to the study of continuous girders and of reinforced concrete.

120. APPLIED MECHANICS II LABORATORY. Junior year, second semester. Laboratory work, three hours. One semester credit. Must accompany or follow Applied Mechanics II or E-II. Professor Seaton, Assistant Professor Wendt, and Mr. Robert.

Tension, compression, shear and bending tests are made on specimens of iron, steel, wood and concrete. These include both standard commercial tests and tests to determine the elastic properties of the materials. Torsion tests are also made on steel shafting. Standard tests are made on cement, on fine and coarse aggregates for concrete, and on brick.

125. GRAPHIC STATICS. Junior year, first semester. Drafting-room practice, supplemented by lectures, three hours. One semester credit. Must accompany or follow Applied Mechanics I. Professor Seaton and Assistant Professor Wendt.

Graphical solutions are made of the stresses existing in a number of typical trusses, under a variety of loadings, and a detail design is made of one of the simpler forms of roof trusses.

130. HYDRAULICS RECITATION. Junior year, both semesters. Class work, three hours. Three semester credits. Prerequisite: Applied Mechanics I. Professor Seaton, Assistant Professor Wendt, and Mr. Robert.

A study of fluid pressure, stresses in containing vessels and pipes, center of pressure, immersion and flotation; Bernoulli's theorem, with applications; flow through orifices, weirs, short and long pipes; loss of head due to various causes; flow of water in open channels, and its measurement; Kutter's formula; impulse and reaction of a jet; elements of water power, impulse wheels, reaction turbines and centrifugal pumps. Text: Daugherty's *Hydraulics*.

135. **HYDRAULICS LABORATORY.** Junior year, both semesters. Laboratory work, three hours. One semester credit. Must accompany or follow Hydraulics Recitation (Ap. Mech. 130). Professor Seaton, Assistant Professor Wendt, and Mr. Robert.

Tests to determine the coefficients of weirs, orifices, tubes and pipes; use and calibration of water meters; tests to determine loss of head in pipes due to various causes; measurement of water in open streams, and tests on water wheels, water turbines, rams and pumps.

140. **CONCRETE CONSTRUCTION RECITATION.** Senior year and elective, both semesters and summer school. Lectures and recitations, one hour. One semester credit. Professor Seaton and Assistant Professor Wendt.

Instruction is given in the principles governing the selection and preparation of materials, the proper proportioning of materials for different conditions, the construction of forms, mixing and handling concrete, elementary reinforced concrete construction, finishing concrete surfaces, stucco and plaster work, and the waterproofing and coloring of concrete. A brief study is made of the application of these principles to the making of concrete foundations, building blocks and bricks, posts, sidewalks, floors, tanks, cisterns, silos, and bridges and culverts. Text: Seaton's *Concrete Construction for Rural Communities*.

145. **CONCRETE CONSTRUCTION LABORATORY.** Senior year and elective, both semesters. Laboratory work, three hours. One semester credit. This course must accompany or follow Concrete Construction Recitation (Ap. Mech. 140). Professor Seaton, Assistant Professor Wendt, and assistants.

Laboratory and field work is given in hand and machine mixing and handling of concrete, and in the construction of forms, for such objects as machine and building foundations, floors, sidewalks, fence posts and building blocks. Tests are made on concrete cylinders and beams to illustrate the effect of different methods of treatment on the strength and reliability of plain and reinforced concrete.

150. **THESIS.** Senior year, continuing through the year. Professor Seaton and Assistant Professor Wendt.

The laboratories of the department furnish an excellent opportunity for experimental work suitable for thesis projects of students in any branch of engineering. Projects in machine design may also be worked out as theses in this department. The subject of the investigation should be selected, in consultation with the head of the department, at the beginning of the first semester of the senior year.

FOR GRADUATES AND UNDERGRADUATES

250. **HIGHWAY ENGINEERING I LABORATORY.** Senior year, first semester. Laboratory work, three hours. One semester credit. Prerequisite: Applied Mechanics II Laboratory. Assistant Professor Wendt.

This is a comprehensive course in testing materials used in highway construction.

COURSES IN MECHANICAL DRAWING AND MACHINE DESIGN

FOR UNDERGRADUATES

160. **MECHANICAL DRAWING I RECITATION.** Sophomore year and elective, first semester and summer school. Lectures and recitations, one hour. One semester credit. Prerequisite: Descriptive Geometry (Arch. 104, 107). Must accompany Mechanical Drawing I Laboratory (Ap. Mech. 165). Professor Seaton, Assistant Professor Pearce, and Mr. Robert.

A study is made of the selection and use of drawing instruments, lettering, developed surfaces and intersections, pictorial methods of representation, working drawings, technical sketching, and methods of reproduction of drawings. Text: French's *Engineering Drawing*.

165. MECHANICAL DRAWING I LABORATORY. Sophomore year and elective, first semester and summer school. Drafting-room practice, three hours. One semester credit. Prerequisite: Descriptive Geometry (Arch. 104, 107). Must accompany Mechanical Drawing I Recitation (Ap. Mech. 160). Professor Seaton, Assistant Professor Pearce, and Mr. Robert.

Practice in the use of drawing instruments, in the construction of the inclined Gothic and Reinhardt systems of letters, and exercises in making working drawings from given plates. Special attention is given to the arrangement of views to secure balance, and to the subject matter and layout of titles and notes. The following supplies are required: triangles, T-square, scale, pencils, pens, ink, erasers, thumb tacks, drawing paper, and a set of drawing instruments. Students are advised not to purchase these supplies until after consulting with the instructor. Text: French's *Engineering Drawing*.

170. MECHANICAL DRAWING II. Sophomore or junior year, second semester, and summer school. Drafting-room practice, nine hours. Three semester credits. Prerequisites: Mechanical Drawing I (Ap. Mech. 160, 165). Kinematics (Ap. Mech. 180) must accompany or precede this course. Professor Seaton, Assistant Professor Pearce, and Mr. Robert.

Free-hand sketches are made from simple machine parts, followed by complete working drawings from these sketches without further reference to the objects. This is followed by the design of cams, gears and quick returns to fulfill specified conditions. Center line drawings are first made, embodying the solutions of the problems, and upon these are built working drawings of the machine parts. An effort is made to follow standard practice in the design of those details usually determined by empirical methods. Velocity diagrams are drawn for the cams and quick returns. Gear teeth are accurately rolled and drawn from templates prepared by the student. Special emphasis is laid upon the proper selection of views to present the necessary information in convenient form, and to give the proper dimensioning of the drawings.

175. MECHANICAL DRAWING III. Junior year, first semester. Drafting-room practice, three hours. One semester credit. Prerequisite: Mechanical Drawing II (Ap. Mech. 170). Steam and Gas Engineering I (Steam and Gas 101) must accompany or precede this course. Professor Seaton and Assistant Professor Pearce.

This includes the solution of a problem on the slide valve by the Zeuner diagram, followed by the design, mostly by empirical methods, of the cylinder, piston, steam chest, and valve of a steam engine. Kent's *Mechanical Engineers' Pocketbook* and Mark's *Mechanical Engineers' Handbook* are extensively used for reference, and each student is expected to have a copy of one of these books.

180. KINEMATICS. Sophomore or junior year, both semesters and summer school. Lectures and recitations, three hours. Three semester credits. Prerequisites: Plane Trigonometry (Math. 101) and Descriptive Geometry (Arch. 104, 107). Professor Seaton, Assistant Professor Pearce, and Mr. Robert.

An analysis of the motions and forms of the parts of machines. Among the subjects discussed are: bearings, screws, worm and wheel, rolling cylinders, cones, and other surfaces; belts, cords and chains; levers, cams and linkwork, with velocity and motion diagrams; quick returns, straight-line motions, and other special forms of linkages;

gearing and combinations of mechanisms. The solution of a large number of graphical and mathematical problems is required in this course. Text: Schwamb and Merrill's *Elements of Mechanism*.

FOR GRADUATES AND UNDERGRADUATES

201. MACHINE DESIGN I RECITATION. Senior year, first semester. Lectures and recitations, three hours. Three semester credits. Prerequisites: Applied Mechanics II and Mechanical Drawing II (Ap. Mech. 110, 170); Steam and Gas Engineering II (Steam and Gas 110). Must accompany Machine Design I Laboratory (Ap. Mech. 205). Professor Seaton and Assistant Professor Pearce.

A study is made of the straining actions in machine elements in general, with special attention to the design of springs, riveted fastenings, screw fastenings, keys, force fits, tubes, plates, journals, bearings, shafting, couplings, and belt, rope, chain and gear transmissions. Some time is devoted to a study of friction and lubrication, to the action of reciprocating parts in engines, and to the problems arising in the design of high-speed machinery. Texts: Kimball and Barr's *Elements of Machine Design* and Lanza's *Dynamics of Machinery*.

205. MACHINE DESIGN I LABORATORY. Senior year, first semester. Drafting-room practice, six hours. Two semester credits. Must accompany Machine Design I Recitation (Ap. Mech. 201). Professor Seaton and Assistant Professor Pearce.

A steam boiler is designed in strict conformity to the A. S. M. E. Boiler Code. Calculations are made for all parts except standard fittings, and working drawings are made. In the latter part of the term designs are made for a large pulley, shaft and shaft coupling.

210. MACHINE DESIGN II. Senior year, second semester. Drafting-room practice, six hours. Two semester credits. Prerequisites: Machine Design I (Ap. Mech. 201, 205). Professor Seaton and Assistant Professor Pearce.

This is a continuation of the preceding course, with the design of a small power shear. Calculations are made for all parts.

215. FLOUR-MILL DESIGN. Senior year, first semester. Drafting-room practice, nine hours, supplemented by lectures and assigned reading. Three semester credits. Prerequisites: Applied Mechanics E-II (Ap. Mech. 115) and Milling Practice I (Mill. Ind. 201). Professor Seaton and Mr. _____.

A design is made for a medium capacity flour mill, including the selection and the planning of the arrangement of the machinery.

Architecture and Drawing

Professor WALTERS
Professor ETHERTON
Instructor HARRIS
Assistant SMITH

The educational and practical value of a systematic course in the various branches of drawing can hardly be overestimated. The general aims of the several courses in industrial art are the same: (a) the cultivation of observation and analysis of form; (b) the development of correct taste; (c) the teaching of the different methods of graphic representation; (d) the acquirement of skill in handling drawing tools.

The instruction offered in architecture is intended to supply the preliminary training required for the practice of architecture. It recognizes the fact that this instruction must have a three-fold object; first, the teaching of sound modern building construction; second, the teaching of different methods of graphic representation; and third, the development of correct taste.

The first is attained, in connection with the work in other departments, by lectures, and by extended laboratory work in heating and plumbing, concrete construction, steel construction, and electric lighting, also by the preparation of building specifications and by investigations of the legal and ethical relation of architect, owner, and contractor. The second involves the teaching of correct perception and analysis of form. An average of twelve hours a week throughout the four years is given to projection drawing, descriptive geometry, isometric drawing, linear perspective, shades and shadows, sketching from casts and from life, architectural drawing, and architectural composition. The development of correct taste is sought by offering much work in sketching and rendering, decoration, landscape architecture, architectural criticism, and architectural composition. Three semesters are devoted to the study of the fundamental principles of design and the styles of the past. Considerable emphasis is also laid on the problems of architecture as related to the needs of rural communities.

COURSES IN ARCHITECTURE AND DRAWING

FOR UNDERGRADUATES.

101. GENERAL DRAWING. Freshman year, first semester. Drafting-room practice, three hours. One semester credit. Mr. Harris and Mr. Smith.

This course includes the fundamentals of free-hand drawing, geometrical drawing, isometric and other axonometric projections; and lettering.

104, 107. DESCRIPTIVE GEOMETRY. Freshman year, second semester. Lectures, one hour; drafting-room practice, six hours. Three semester credits. Prerequisite: General Drawing (Arch 101). Mr. Harris and Mr. Smith.

This is a continuation of the preceding course and includes the fundamentals of descriptive geometry, involving the point, line and plane; the intersection and development of the surfaces of geometric solids; the study of single and double curved surfaces of revolution, their sections, tangents and tangent planes; development of surfaces of revolution; problems involving the curved and warped surfaces.

110. ARCHITECTURAL DRAWING I. Freshman year, second semester. Drafting-room practice, six hours. Two semester credits. Prerequisite: General Drawing (Arch. 101). Professor Walters.

The study of Gothic and Romanesque ornaments, tracery windows, and other details, from plaster models and blue prints; also the analysis and study of standard forms of the five orders of architecture.

113. ARCHITECTURAL DRAWING II. Sophomore year, first semester. Drafting-room practice, six hours. Two semester credits. Prerequisite: Architectural Drawing I (Arch. 110). Professor Walters.

The work of the preceding term is continued and facades and details of the modern residence, the school building, the church and the bank are studied.

116. SHADES AND SHADOWS. Sophomore year, first semester. Drafting-room practice, three hours. One semester credit. Prerequisite: Descriptive Geometry (Arch. 104, 107). Mr. Smith.

Shadows upon the planes of projection; shadows upon oblique planes and curved surfaces; shades and various exercises in brush and line shading.

119. RESIDENCES. Sophomore year, first semester. Class work, three hours. Three credits. Professor Walters.

A course of lectures on the location of the residence, the improvement and planting of the home lot, the arrangement of the main floor, second floor and basement, modern methods of plumbing and heating, the exterior and interior decoration of the house, modern building materials, the arrangement and character of the dwellings of the modern Europeans and of the historic nations of the past.

122, 125, 128, 131. ARCHITECTURAL COMPOSITION I, II, III, IV. Beginning with the second semester of the sophomore year and extending through four consecutive semesters. Drafting-room practice, nine hours a week. Three credits each semester. Prerequisite: Architectural Drawing II (Arch. 113). Professor Walters.

The first term is given to the planning of a residence, and involves the preparation of a complete set of plans and elevations, sections and detail drawings. The second term takes up the planning of a Gothic church. The third is given to the planning of a modern Romanesque school building. The fourth takes up the planning of a small public building of a monumental character, involving steel and concrete construction. Sets of blue prints of all finished work must be left with the department if required by the professor in charge of the work.

134. LINEAR PERSPECTIVE. Sophomore year, second semester. Drafting-room practice, three hours. One semester credit. Prerequisite: General Drawing (Arch. 101). Mr. Smith.

Vanishing points, vanishing traces, measuring points, cylindric perspective, perspective corrections, and various exercises in representing geometric solids and architectural details.

137. COLOR AND ORNAMENT. Sophomore year, second semester. Class work, three hours. Three semester credits. Professor Walters.

A course of illustrated lectures on the theory of color and color harmony; principles of decoration; the standard forms of Greek, Roman and Gothic mouldings; the Tuscan, Doric, Ionic, Corinthian and Composite columns and their entablatures; the lotus, anthemion, acanthus, and laurel ornament; Roman, medieval, and modern lettering; the ornament of the Gothic period; modern methods of building decoration.

140. HISTORY OF ARCHITECTURE I. Junior year, first semester. Class work, three hours. Three semester credits. Professor Walters.

This course is taught by lectures, illustrated by photographs, plaster models, and stereopticon views. It deals with the development of the architecture of the ancient Egyptians, Chaldeans, Greeks and Romans; the architecture of the Romanesque, Gothic and Renaissance period; the architecture of Byzantium and of the Moors.

143. HISTORY OF ARCHITECTURE II. Junior year, second semester. Class work, three hours. Three semester credits. Professor Walters.

This course comprises the study of modern architecture in the countries of Northern Europe and America. The architectural history of the United States Capitol building and the University of Virginia; the Colonial, neo-Gothic, American Romanesque and Spanish-American styles; the modern American reinforced concrete styles; and the modern efforts at city planning.

146, 149. MATERIALS OF CONSTRUCTION. Junior year, second semester. Lectures, three hours; laboratory, six hours. Five semester credits. Prerequisite: Applied Mechanics I (Ap. Mech 101, 105). Mr. Harris.

The lecture course is a study of the fundamental considerations in the use of materials entering into the construction and design of foundations, stone and brick walls, floors, beams, and columns. The laboratory work includes the practical design of structural elements of these materials.

152. CLAY MODELING. Junior year, second semester. Laboratory, six hours. Two semester credits. Mr. Harris.

Clay and plaster modeling of architectural details, historic ornaments, and decorative statuary; also methods of making plaster casts. Discussion of the plastic ornament applied in building decoration.

155. INK RENDERING. Junior year, second semester. Drafting-room practice, three hours. One credit. Professor Walters.

This course includes consideration of form analysis, free-hand perspective, shades and shadows from objects and models, drawing from the cast, and different methods of pencil, crayon and pen rendering. Drawings are prepared for photo-engraved plates used in bulletins, magazines and books.

158. COLOR RENDERING. Senior year, first semester. Laboratory, three hours. One semester credit. Prerequisites: Linear Perspective, and Ink Rendering (Arch. 134 and 155). Professor Walters.

Study of the principles that underlie good design and harmonious color combinations. Rendering in water color of ornaments, building elevations and simple landscapes.

161, 164. TRUSSES. Senior year, first semester. Lectures, two hours; drafting and laboratory, six hours. Four semester credits. Prerequisite: Materials of Construction (Arch. 146, 149) and Graphic Statics (Ap. Mech. 125). Mr. Harris.

Study of the Fink, Howe, Pratt and other truss types, and the essentials of the design of trusses in wood and steel. Both the graphic and the analytic methods of finding stresses in truss members are employed.

167. SPECIFICATIONS. Senior year, first semester. Class work, two hours. Two semester credits. Prerequisites: Materials of Construction, Architectural Composition III (Arch. 146, 149, 128). Professor Ether-ton.

The course comprises discussion and preparation of standard specifications for residences and public buildings; estimates of the materials and labor required in erecting and completing these buildings; methods of making lump estimates; discussion of the principles and form of building contracts; study of the legal relation of the architect, the owner, and the contractor; discussion of state laws concerning the erection of public buildings; labor laws; lien laws; city ordinances; building permits; building insurance; contracts and bonds.

170. MUNICIPAL ENGINEERING. Senior year, second semester. Class work, two hours. Two semester credits. Professor Walters.

A course of lectures on the different methods of McAdam, Telford, brick, cement and asphalt paving and on the construction of waterworks and sewer systems.

173. LANDSCAPE DESIGN. Senior year, second semester. Drafting-room practice, six hours. Two semester credits. Professor Walters.

Each student is required to draw and finish in water color a set of landscape designs for home lot, a public square, and a city park.

176. SEMINAR. Sophomore, junior and senior years. One hour a week. Professor Walters and Professor Ether-ton.

All architectural students are required to attend the biweekly seminar sessions of the Division of Mechanic Arts and the biweekly sessions of the seminar of the Department of Architecture which alternate with the former from week to week. In the departmental seminar the work consists of reading and discussing papers pertaining to various architectural topics, presented by the students and the faculty, of inspecting representative buildings and building operations, and of testing new building materials and construction processes.

In the general seminar, lectures are given by the engineering faculty and eminent practicing engineers and architects on topics of general interest to architectural and engineering students.

179. **THESIS.** Senior year, first and second semesters. Professor Walters.

In the spring of the senior year the student prepares a thesis, consisting of a set of original drawings, complete with details and specifications, for a public building. This work must be done in the drafting-room of the department and under the supervision of the professor of architecture, who decides on the cost limit and style of the building and the size and number of plates required.

191. **ILLUSTRATING.** Elective, first semester. Drafting-room practice, six hours. Two semester credits. Prerequisite: Ink Rendering (Arch. 155). Professor Walters.

Study of different methods of pen and brush drawing for newspaper, pamphlet and book illustrations.

194, 195. **RURAL ARCHITECTURE.** Senior year, first semester. Lectures, one hour; drafting-room practice, six hours. Three semester credits. Professor Etherton.

The course comprises lectures and the preparation of drawings and specifications for barns, dairy stables, and other farm buildings.

197, 198. **HOME ARCHITECTURE.** Elective, both semesters. Lectures, one hour; drafting-room practice, six hours. Three semester credits. Professor Etherton.

A study of the problems of location, arrangement of rooms, modern conveniences, heating and plumbing, floor plans, details and elevations of modern residences.

Civil Engineering

Professor CONRAD
Professor GEARHART
Associate Professor WALKER
Instructor FRAZIER

The instruction in civil and highway engineering is given by means of lectures and recitations, and by the practice in the field, in the drafting room, and in the laboratory. The heaviest technical work of the curriculum falls in the junior and senior years, during which, in addition to studies in other departments, courses are given in civil engineering drawing and in the analysis of stresses in framed structures, structural design, drainage and irrigation engineering, construction and design in masonry and concrete, railways, highway engineering, astronomy, and geodesy. During the entire senior year considerable time is devoted to thesis work.

The seminar, coming once each week, affords the students an opportunity to become acquainted with modern engineering practice through discussions and references to current periodicals.

In addition to the laboratory equipment found in other engineering departments, which is available to civil engineering students as well, the Department of Civil Engineering possesses a good assortment of transits, levels, plane tables, tapes, and chains. The department also owns a precise level, a direction theodolite, a repeating theodolite, and a base-line outfit. The department expects to install a recording gauge which will make a continuous record of the stage of the Kansas river, to be used in computing the flood discharge of that stream. This information will be of great value in future years as a basis for designing works for flood protection.

COURSES IN CIVIL ENGINEERING

FOR UNDERGRADUATES

101. SURVEYING I RECITATION. Freshman or sophomore year, both semesters. Class work, two hours a week for about one-half of the semester. One semester credit. Prerequisite: Plane Trigonometry (Math. 101). Assistant Professor Frazier.

This is a brief course in the use and care of engineer's surveying instruments. Text: Pence and Ketchum's *Surveying Manual*.

105. SURVEYING I LABORATORY. Freshman or sophomore year, both semesters. Field work, six hours a week during the second half of the semester. One semester credit. Prerequisite: Plane Trigonometry (Math. 101). Assistant Professor Frazier.

The time is devoted to exercises in practical problems involving the use of the transit and level. Special emphasis is given to methods of keeping field notes. Text: Pence and Ketchum's *Surveying Manual*.

110. SURVEYING II RECITATION. Sophomore year, first semester. Class work, two hours. Two semester credits. Prerequisite: Surveying I. Assistant Professor Frazier.

The course comprises the study of land topographic and hydrographic surveying. Text: J. B. Johnson's *Theory and Practice of Surveying*.

115. SURVEYING II LABORATORY. Sophomore year, first semester. Field and drafting-room work, three hours. One semester credit. Prerequisite: Surveying I Laboratory. Assistant Professor Frazier.

Exercise in plane and topographic surveying, including both field work and plotting. Text: J. B. Johnson's *Theory and Practice of Surveying*.

120. MASONRY AND FOUNDATIONS. Sophomore year, second semester. Class work, two hours. Two semester credits. Prerequisite: Engineering Physics I (Physics 211). Professor Conrad.

A course devoted to a study of the principles underlying the design and construction of foundations, the stresses in plain masonry structures, and the method of designing such structures.

125. CIVIL ENGINEERING DRAWING I. Sophomore year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Mechanical Drawing I (Ap. Mech. 160, 165). Assistant Professor Frazier.

A course devoted to the application of stereotomy, shades and shadows, isometric drawing, and perspective and copying working drawings of engineering structures. The principles are explained to the students by such short lectures as seem necessary for the purpose. No text book is used.

130. ELEMENTS OF IRRIGATION AND DRAINAGE RECITATION. Elective, first semester. Class work, two hours a week for the first half of the

semester. One semester credit. No prerequisite. Assistant Professor Frazier.

This course comprises a brief treatment of the subjects from the agriculturalist's point of view. Texts: Elliott's *Engineering for Land Drainage*, and Fortier's *Use of Water in Irrigation*.

135. ELEMENTS OF IRRIGATION AND DRAINAGE LABORATORY. Elective, first semester. Field work, six hours a week for the second half of the semester. One semester credit. No prerequisite. Assistant Professor Frazier.

Practice work in the field and drawing room is devoted to the laying out and plotting of simple farm drainage and irrigation systems. Same texts as in C. E. 130.

140. FARM SANITATION AND WATER SUPPLY. Elective, second semester. Class work, two hours. Two semester credits. No prerequisite. Assistant Professor Frazier.

A study of sources of water supply, installation of cisterns on the farm, and farm sanitation. No text is used, the instruction being given by lectures, bulletins and library references.

145. RAILWAY ENGINEERING I. Junior year, first semester. Class work, two hours. Two semester credits. Prerequisites: Surveying II and Civil Engineering Drawing I (C. E. 110, 125). Assistant Professor Frazier.

This is a short course in the theory of railway engineering based on Wellington's mechanical theory. Considerable time is also devoted to the study of track construction and maintenance, and to the design of yards and terminals. Texts: Raymond's *Elements of Railroad Engineering*, and Allen's *Railroad Curves and Earthwork, with Tables*.

150. SURVEYING III RECITATION. Junior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Surveying II. Assistant Professor Frazier.

This course comprises a study of city and mine surveying, computation of volumes, and railroad curves. Texts: J. B. Johnson's *Theory and Practice of Surveying*, and Allen's *Railroad Curves and Earthwork, with Tables*.

155. SURVEYING III LABORATORY. Junior year, first semester. Field and drafting-room work, three hours. One semester credit. Prerequisite: Surveying II Laboratory. Assistant Professor Frazier.

The field exercises are devoted to practice work in topographic surveying and railroad curves. Time in the drafting room is devoted principally to topographic mapping. Texts same as in C. E. 150.

160. DRAINAGE AND IRRIGATION I. Junior or senior year, second semester. Class work, three hours. Three semester credits. Hydraulics (Ap. Mech. 130) must be taken with this course or precede it. Professor Conrad.

In this course a study is made of the application of engineering principles to the design and construction of drainage and irrigation works. Considerable attention is paid to the development of ground-water supplies for irrigation. Texts: Elliott's *Engineering for Land Drainage*, and Newell and Murphy's *Principles of Irrigation Engineering*.

165. SEMINAR. Sophomore, junior and senior years, both semesters. One hour a week. Professor Conrad and Assistant Professor Frazier.

Every other week the members of the three upper classes in the Civil Engineering Department meet to hear lectures on civil engineering subjects or to review and discuss articles bearing on current engineering

literature. On alternate weeks these men meet in a general seminar with the students from the other divisions. At this general meeting, lectures are given by members of the faculty and eminent engineers.

170. THESIS. Senior year, continuing through both semesters. Professor Conrad. All candidates for the degree of bachelor of science in civil engineering are required, during their senior year, to prepare a thesis. This thesis may be a report on a proposed design, an original investigation, or a library research. Civil engineering students may, with the approval of the head of the department, take their thesis work outside of the department. The thesis subject must be selected and approved by the head of the department in which the work is done before October first next preceding the commencement at which the candidate proposes to graduate.

FOR GRADUATES AND UNDERGRADUATES.

201. BRIDGE STRESSES. Senior year, first semester. Class work, four hours. Four semester credits. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Professor Conrad.

This course involves a study of the algebraic and graphical methods of computing the stresses in bridges, leading up to the subject of Bridge Design in the following semester. Text: Merriman and Jacoby's *Roofs and Bridges*, Part I.

205. CIVIL ENGINEERING DRAWING II. Senior year, first semester. Drafting room, six hours. Two semester credits. Prerequisite: Civil Engineering Drawing I (C. E. 125). Professor Conrad.

This course is devoted to graphic statics and the design of simple roof trusses in timber and steel. Text: Merriman and Jacoby's *Roofs and Bridges*, Part II.

210. ASTRONOMY AND GEODESY RECITATION. Senior year, first semester. Class work, three hours. Three semester credits. Prerequisite: Surveying III. Professor Conrad.

A brief course in the elements of practical astronomy followed by a study of the precise methods of surveying and leveling. Text: J. B. Johnson's *Theory and Practice of Surveying*.

215. ASTRONOMY AND GEODESY LABORATORY. Senior year, first semester. Field work, three hours. One semester credit. Prerequisite: Surveying III Laboratory. Professor Conrad.

The work is devoted to simple astronomical observations, principally for determining the true meridian; to base line measurements and triangulation work. Each student will also be required to run a short circuit with the precise level.

220. WATER SUPPLY. Senior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Hydraulics (Ap. Mech. 130). Assistant Professor Frazier.

The course deals with the water supply for cities from the standpoints of consumption, collection, storage, distribution, and purification.

225. SEWERAGE. Senior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Hydraulics (Ap. Mech. 130). Assistant Professor Frazier.

A study is made of the problems met in the design and construction of sewer systems and disposal plants for cities of moderate size. Text: Polwell's *Sewerage*.

230. HIGHWAY ENGINEERING I RECITATION. Senior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Professor Gearhart.

A study of the principles underlying the location, construction and maintenance of all ordinary types of roads and pavements. Text: Blanchard and Drown's *Textbook of Highway Engineering*. (For the laboratory work in connection with this course, see Ap. Mech. 250.)

240. BRIDGE DESIGN RECITATION. Senior year, second semester. Class work, three hours. Three semester credits. Prerequisite: Bridge Stresses (C. E. 201). Professor Conrad.

This course comprises a study of the designing of pin connected and riveted simple trusses for highway and railroad traffic; the design of through and deck-plate girders is also taken up. Text: Merriman and Jacoby's *Roofs and Bridges*, Part III.

245. BRIDGE DESIGN LABORATORY. Senior year, second semester. Drawing, three hours. One semester credit. Prerequisite: Bridge Stresses (C. E. 201). Bridge Design (C. E. 240) must accompany this course. Professor Conrad.

This course comprises general drawings for a highway truss bridge, a railroad truss bridge and a railroad deck plate girder. Text: Merriman and Jacoby's *Roofs and Bridges*, Part III.

250. CONCRETE DESIGN RECITATION. Senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Professor Conrad.

An application of the principles of reinforced concrete to the design of chimneys, buildings, retaining walls, dams and bridges. Text: Taylor and Thompson's *Concrete, Plain and Reinforced*.

255. CONCRETE DESIGN LABORATORY. Senior year, second semester. Drafting-room work, three hours. One semester credit. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Professor Conrad.

In this course the students make drawings of reinforced concrete retaining walls, dams, slab and girder bridges and arch bridges. Text: Taylor and Thompson's *Concrete, Plain and Reinforced*.

260. RAILWAY ENGINEERING II RECITATION. Optional, senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Railway Engineering I (C. E. 145). Assistant Professor Frazier.

This course comprises the study of railway operation and maintenance.

265. RAILWAY ENGINEERING II LABORATORY. Optional, senior year, second semester. Field and drafting room, six hours. Two semester credits. Prerequisite: Railway Engineering I (C. E. 145). Assistant Professor Frazier.

In the field, reconnaissance and survey of a short railroad is made, and the office work consists in making the maps, profiles and estimates from the survey. Text: Allen's *Railroad Curves and Earthwork*.

270. HIGHWAY ENGINEERING II RECITATION. Optional, senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Highway Engineering I (C. E. 230). Professor Gearhart.

This course consists in a study of the highway laws and of the highway administration in the various states, and of highway economics.

275. HIGHWAY ENGINEERING II LABORATORY. Optional, senior year, second semester. Field and drafting room, six hours. Two semester credits. Prerequisite: Highway Engineering I (C. E. 230). Professor Gearhart, and assistant.

In the field, a reconnaissance and survey for a highway a few miles long is made. The work in the drafting room consists in making the maps, profiles and estimates from the survey.

280. DRAINAGE AND IRRIGATION II RECITATION. Optional, senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Drainage and Irrigation I. Instructor _____.

A continuation of the former course in Drainage and Irrigation, dealing with the design of irrigation structures and the management of irrigation projects.

285. DRAINAGE AND IRRIGATION II LABORATORY. Optional, senior year, second semester. Field and drafting room, six hours. Two semester credits. Instructor _____.

The field work consists in making the survey for a drainage and irrigation project. In the office the maps, estimates and designs will be made, using the survey as a basis.

Electrical Engineering

Professor REID
Assistant Professor KLOEFFLER
Fellow BJORKMAN

Instruction in this course is given by means of textbooks, lectures, reference work, and laboratory periods. The class work is carefully illustrated by means of demonstration apparatus and the projection lantern. The course is designed to provide the necessary preparation for young men who desire to engage in the practical field of electrical engineering, or for those who desire to assume the control of central stations as managers, as superintendents, or as consulting engineers.

The electrical laboratory for the work of the third year is provided with standard instruments of measurements, including standards of resistance, self-induction, capacity, etc. A complete line of standard makes of ammeters, voltmeters, wattmeters, and galvanometers is also provided. The different laboratories of the department are supplied with electric current from the following sources: 120-volt storage-battery circuit; 110-volt direct-current circuit; 110-volt alternating-current circuit; 220-volt direct-current circuit. Voltages up to 60,000 can be produced in the dynamo laboratory for testing purposes.

The modern equipment contained in the telephone laboratory has been made possible through the liberal coöperation of various telephone companies. It includes a Western Electric demonstration panel, containing all parts and circuits for connecting two subscribers through the A board and B board of the multi-office exchange; a Swedish-American magneto wall switchboard; a demonstration outfit of the Automatic Telephone Company type, including line switches, first and second selectors and connector switches; Kellogg Switchboard & Supply Company's switchboard panel and two demonstrating panels of the Stromberg-Carlson type, one containing all the parts and circuits for the magneto switchboard and the other the same for common battery board. A complete line of bridging magneto and common battery wall telephone sets of all above-mentioned makes, including two of Leigh Cracraft type, will be found in the laboratory. In addition there are series telephone sets, desk telephones, various individual telephone parts and potentiometer boards, etc., for making transmission efficiency tests.

The electrical engineering laboratory is provided with a number of standard commercial machines, among them a 30-kilowatt 2300-volt polyphase alternating-current generator, a 15-kilowatt 125-volt alternating-current generator, which may be connected as a single-phase, two-phase, three-phase, six-phase or twelve-phase machine; a $7\frac{1}{2}$ -kilowatt synchronous converter, which may be used as a one-, two-, three-, or four-phase motor; single- and three-phase induction motors; a 5-horsepower phase-wound induction motor; a 20-horsepower auxiliary pole 220-volt direct-current motor, with a speed range from 250 to 1000 R. P. M.; a 26-horsepower 220-volt direct-current motor; a 15-kilowatt direct-current generator, a Wood arc machine, a $4\frac{1}{2}$ -kilowatt 125-volt direct-current generator, and several smaller machines; a 60-cell 160-ampere-hour storage battery, current transformers, arc lamps, constant potential transformers, 20,000- and 60,000-volt testing transformers, marble and slate switchboards, a Tirrel regulator, speed controllers, and a full line of ammeters, voltmeters, wattmeters, etc., for testing purposes.

Recent additions to the laboratory include a 3-movement oscillograph with photographing attachments, with which simultaneous waves of three quantities may be observed and photographed; and a phase-changing set consisting of two $7\frac{1}{2}$ -kilowatt alternating-current generators and two 15-horsepower direct-current motors, speed variable from 600 to 1800 revolutions per minute. All four machines are mounted on the same bed-plate, and by means of flanged couplings can be run in any combination of two, three, or four machines. The generator armature windings are brought out to 12 terminals and may be connected for single-, two- and three-phase Y, or delta six-phase and twelve-phase, and when running in synchronism the armatures of the two machines may be turned, with reference to each other, through 180 degrees, so that any phase difference that is desired may be obtained. The generators may be used in parallel, as synchronous motors, and in any other desired combinations.

The equipment includes also two compound-wound direct-current generators on the same sub-base, to illustrate generators in parallel operation, Edison 3-wire system, "pump-back" factory efficiency tests, etc.; a 10 kw. special rotary converter, designed for use in single-, three- or six-phase operation, having amortisseur winding speed-limiting and oscillating devices and commutating poles. Three 5 kw. transformers are accessories of this machine. A pair of 6 kw. compound-wound generators will be used to furnish the laboratory with a 110-220-volt 3-wire system from the 220-volt lines supplied by the power plant, and to illustrate commercial use of such systems. The Electric Controller and Manufacturing Company, of Cleveland, have donated a valuable automatic motor-starter and controller, such as is used with motors driving machine tools.

COURSES IN ELECTRICAL ENGINEERING

FOR UNDERGRADUATES

101. DIRECT-CURRENT MACHINES I RECITATION. Junior year, first semester. Recitations or lectures, three hours. Three semester credits. Prerequisites: Calculus II (Math. 116) and Engineering Physics II (Physics 212). Professor Reid.

The work consists of a detailed study of the fundamental principles of magnetic and electric circuits and their application to the various types of direct-current machines. Numerous problems involving the application of the principles are given as a part of the course. The class work is planned to coordinate with the work in the electrical engineering laboratory. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol. I.

105. DIRECT-CURRENT MACHINES I LABORATORY. Junior year, first semester. Laboratory work, three hours. One semester credit. This course should accompany or follow Direct-current Machines I Recitation. Assistant Professor Kloeffer.

A series of experiments is outlined which is designed to necessitate careful, accurate measurement. The student is obliged to make all electrical connections with the necessary instruments in the circuit, and to record the required data. From the laboratory records a written report upon each experiment or test must be submitted. The laboratory exercises include tests for armature and field resistance, potential curves, machine characteristics, motor and generator efficiencies. Text: Swenson and Frankenfield's *Testing of Electro-magnetic Machinery*, Vol. I.

110. DIRECT-CURRENT MACHINES II RECITATION. Junior year, second semester. Lectures or recitations, three hours. Three semester credits. Prerequisite: Direct-current Machines I. Professor Reid.

This course is a continuation of Direct-current Machines I. It involves a detailed study of the various types of direct-current machinery with respect to theory and operation. The latter part of the course is devoted to a special examination of the different methods of testing generators and motors, and to the special application of the different classes of machines to commercial uses. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol. I.

115. DIRECT-CURRENT MACHINES II LABORATORY. Junior year, second semester. Laboratory work, three hours. One semester credit. This course should accompany or follow Direct-current Machines II Recitation. Assistant Professor Kloeffer.

Special attention is given in this course to the different methods of determining generator and motor efficiencies and to the proper tabulation and interpretation of results. Text: Swenson and Frankenfield's *Testing of Electro-magnetic Machinery*, Vol. I.

120. INSTRUMENTS AND CALIBRATION RECITATION. Junior Year, first semester. Lectures and recitations, one hour. One semester credit. Prerequisites: Calculus II (Math. 116) and Engineering Physics II (Physics 212). Assistant Professor Kloeffer.

This course includes a study of the different types of electrical measuring instruments and their application to electrical engineering testing. Text: Jansky's *Electrical Meters*, supplemented by lectures and notes.

125. INSTRUMENTS AND CALIBRATION LABORATORY. Junior year, first semester. Laboratory work, three hours. One semester credit. This course should accompany or follow Instruments and Calibration Recitation. Assistant Professor Kloeffer.

The laboratory work in this subject includes the calibration of both direct and alternating-current measuring instruments and their uses in measuring current, potential, power, resistance, inductance, and capacity.

130. ELECTRICAL ENGINEERING M-I RECITATION. Senior year, first semester. Lectures or recitations, three hours. Three semester credits. Prerequisites: Engineering Physics II (Physics 212) and Calculus II (Math. 116). Assistant Professor Kloeffer.

This course covers the subject of direct-current machines with reference to the fundamental laws of the electric circuit, the principles of direct-current machinery, and the more important commercial tests. Text: Bailey's *Dynamo-Electric Machinery*.

135. ELECTRICAL ENGINEERING M-I LABORATORY. Senior year, first semester. Laboratory, three hours. One semester credit. This course should accompany or follow Electrical Engineering M-I Recitation. Assistant Professor Kloeffer.

Practice is given in the proper use of electrical measuring instruments. The experiments include a variety of tests requiring accurate observation, and a knowledge of the theory of dynamo machines. The various standard characteristics and efficiency tests are given. A written report on each test is required.

140. ELECTRICAL ENGINEERING M-II RECITATION. Senior year, second semester. Lectures and recitations, three hours. Three semester credits. Prerequisite: Electrical Engineering M-I. Assistant Professor Kloeffer.

The work covers briefly the important principles of alternating-current phenomena. The leading types of alternating-current machinery and apparatus are discussed with reference to their operation and their adaptability to different classes of service. Text: Bailey's *Dynamo-Electric Machinery*.

145. ELECTRICAL ENGINEERING M-II LABORATORY. Senior year, second semester. Laboratory work, three hours. One semester credit. Assistant Professor Kloeffer.

This course includes practice in the use of alternating-current instruments; standard tests of alternators, motors, and transformers; and methods of operating the different types of alternating-current machinery.

150. ELECTRICAL MACHINE DESIGN I. Senior year, first semester. Laboratory work, three hours. One semester credit. Prerequisite: Direct Current Machines II. Assistant Professor Kloeffer.

The purpose of the course is to acquaint the student with the principles of commercial design of direct-current machinery. Each student is required to make the necessary calculations and drawings for a direct-current generator. Text: Gray's *Electrical Machine Design*.

155. ELECTRICAL MACHINE DESIGN II. Senior year, second semester. Laboratory, six hours. Two semester credits. Prerequisites: Alternating Current Machines II, and Electrical Machine Design I. Assistant Professor Kloeffer.

This course embraces the elementary principles underlying the design of alternating-current apparatus. Students are required to make calculations and drawing for an alternating-current machine. Text: Gray's *Electrical Machine Design*.

160. ELECTRICAL ENGINEERING C RECITATION. Senior year, second semester. Recitations or lectures, two hours. Two semester credits. Prerequisite: College Physics. Mr. Biorkman.

This work is designed to cover briefly the fundamental principles of direct-current and alternating-current electricity. Emphasis is laid upon the proper installation and operation of the different classes of machines, and the use of electricity for lighting and power. Text: Morecroft's *Continuous and Alternating Machines*.

165. ELECTRICAL ENGINEERING C LABORATORY. Senior year, second semester. Laboratory work, three hours. One semester credit. Mr. Biorkman.

The laboratory practice is designed to give the student a knowledge of the most important commercial tests. The proper use of electrical instruments is emphasized. A written report of each laboratory test is required.

190. SEMINAR. Sophomore, junior and senior years; required throughout each year. Lectures and discussions, one hour a week. Professor Reid and Assistant Professor Kloeffer.

The work of these courses is intended to give students of electrical engineering the opportunity to keep informed regarding the latest discoveries and research work along the special line which they have chosen. Reviews of current electrical literature are required, and discussions of articles reviewed are made the basis of the class work. On alternate weeks all engineering students meet together for lectures by members of the engineering faculty or by eminent engineers.

195. THESIS. Senior year, continuing through both semesters. Professor Reid and Assistant Professor Kloeffer.

The subject for thesis work is selected in consultation with the head of the department, at the beginning of the first semester of the senior year. The work is continued during the second semester. Every opportunity is given the student to work out original ideas as to design and operation of electrical apparatus and machinery.

FOR GRADUATES AND UNDERGRADUATES

201. ALTERNATING-CURRENT MACHINES I RECITATION. Junior year, second semester. Recitations or lectures, two hours. Two semester credits. Prerequisites: Calculus II (Math. 116) and Direct-current Machines II. Professor Reid.

The work consists of a mathematical treatment of alternating-current phenomena. A study is made of the vector method of treating alternating-current problems. The solution of problems involving single and polyphase circuits forms an important part of the course. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol. II.

205. ALTERNATING-CURRENT MACHINES I LABORATORY. Junior year, second semester. Laboratory work, three hours. One semester credit. This course should accompany or follow Alternating-current Machines I Recitation. Professor Reid.

It is the aim of this course to provide a series of experiments illustrating the theoretical work of the lecture room. Practice is given in the accurate measurement of capacity and inductance, and the effect of each upon the circuit. The latter part of the course is devoted to a study of polyphase circuits.

210. ALTERNATING-CURRENT MACHINES II RECITATION. Senior year, first semester. Recitations or lectures, four hours. Four semester credits. Prerequisite: Alternating-current Machines I. Professor Reid.

This is a continuation of Alternating-current Machines I. The course consists of a study of the theory of alternating-current machinery, alternators, synchronous motors, induction motors, transformers, and the various devices used in connection with alternating-current work. A study is also made of the application of the different types of machinery to industrial uses. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol. II.

215. ALTERNATING-CURRENT MACHINES II LABORATORY. Senior year, second semester. Laboratory work, six hours. Two semester credits. This course should accompany or follow Alternating-current Machines II Recitation. Professor Reid.

A series of experiments involving special and commercial tests of alternators, synchronous motors, transformers, and the different types of alternating-current machinery and apparatus.

220. TELEPHONY RECITATION. Senior year, first semester. Class work, two hours. Two semester credits. Prerequisites: Calculus II (Math. 116) and Engineering Physics II (Physics 212). Assistant Professor Kloeffer.

This course consists of a consideration of the principles of acoustics and alternating-current phenomena involved in telephone practice. A detailed investigation is made of telephone apparatus and circuits, with reference to their adaptation to various kinds of telephone service. This is followed by a study both of the design and maintenance of telephone lines and central-office apparatus, and of central-office methods, the selection of apparatus, and methods of handling telephone traffic. Text: McMeen and Miller's *Telephony*.

225. TELEPHONY LABORATORY. Senior year, first semester. Laboratory, three hours. One semester credit. This course should accompany or follow Telephony Recitation. Assistant Professor Kloeffer.

This course includes the study and measurement of telephone parts, the actual wiring of telephone circuits on the magneto, common battery and automatic systems, location of line trouble and transmission efficiency tests on various types of apparatus and circuits.

230. GENERATION AND DISTRIBUTION OF ELECTRICAL ENERGY. Senior year, second semester. Recitations or lectures, three hours. Three semester credits. Prerequisite: Alternating-current Machines II. Professor Reid.

This course is designed to cover station operation and management, methods of power transmission, and systems of distribution. Each student is assigned an important electrical power station, upon which a detailed written report is required. Text: Ferguson's *Elements of Electrical Transmission*.

235. ILLUMINATING ENGINEERING. Senior year, second semester. Lectures and recitations, two hours. Two semester credits. Prerequisites: Calculus II (Math. 116) and Engineering Physics II (Physics 212). Assistant Professor Kloeffer.

This course is devoted to a study of photometry and light standards and the principles of illumination. The different types of incandescent and arc lamps are discussed with reference to their efficiency and adaptability to different classes of lighting. Systems of street illumination are also studied.

240. ELECTRIC RAILWAYS. Senior year, second semester. Recitations or lectures, two hours. Two semester credits. Prerequisite: Alternating-current Machines II (Elect. Eng. 210). Professor Reid.

A study is made of the development of electric traction; traffic conditions and train schedules; speed-time curves; power generation and distribution for electric railways; signal systems; types of cars and locomotives in use; various control systems; and adaptability of electric traction to steam roads. Text: Harding's *Electric Railway Engineering*.

Farm Machinery

Assistant Professor WIRT
Instructor WISEMAN

The courses in farm machinery are designed to meet the needs of students studying agriculture and agricultural engineering. Construction, adjustment, operation, selection and care of machinery are taught in the classroom by lectures and recitations. Construction adjustment and operation are emphasized in the laboratory and in field tests. The De-

partment has about \$10,000 worth of the latest machinery, which has been loaned by the manufacturing companies.

The Department is well supplied with dynamometers and other equipment for making exhaustive tests on machines in the field and laboratory. With these facilities, research work of considerable importance can be carried on by both undergraduate and graduate students.

COURSES IN FARM MACHINERY

FOR UNDERGRADUATES

101. FARM FIELD MACHINERY RECITATION. Sophomore year, second semester. Class work, two hours. Two semester credits. Assistant Professor Wirt.

This is a beginning course in farm machinery, and takes up certain important definitions and mechanical principles, including the lever, eveners, tackles, etc. The development, construction, adjustment, operation and use of tillage, cultivating, seeding, harvesting, haying and miscellaneous machinery and the selection and care of farm machinery are subjects of study in this course.

105. FARM FIELD MACHINERY LABORATORY. Sophomore year second semester. Laboratory, three hours. One semester credit. Assistant Professor Wirt and Mr. Wiseman.

A detailed study of the machines taken up in the classroom is made both in the laboratory and in the field.

110. POWER FARMING MACHINERY. Junior year, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Farm Field Machinery. Assistant Professor Wirt.

Such machines as engine plows, corn shellers, feed mills, hay balers, ensilage cutters and threshing machines are studied in the laboratory and in the field.

115. FARM MECHANICS. Elective, first semester. Laboratory, three hours. One semester credit. Mr. Wiseman.

This course consists of practice in: ropework, including knot tying, splicing, and halter making; belt splicing; babbitting; soldering; pipe fitting; wire-fence splicing; and repairing of farm machinery.

175. THESIS. Senior year, continuing through both semesters. Assistant Professor Wirt.

Various problems connected with the design and use of farm machinery form an inviting field for research work. The subject of the investigation should be selected, in consultation with the head of the department, at the beginning of the first semester of the senior year.

FOR GRADUATES AND UNDERGRADUATES

201. ADVANCED FARM MACHINERY. Senior year, first semester. Laboratory, six hours. Two semester credits. Prerequisites: Farm Field Machinery and Power Farming Machinery (Farm Mach. 101, 105, and 110). Assistant Professor Wirt.

Draft tests are made on the machines studied in Farm Field Machinery and Power Farming Machinery. A study is made, also, of the cost of operating these machines.

205. FARM MACHINERY RESEARCH. Elective, first and second semesters. Six to fifteen hours laboratory or reading. Two to five semester credits. Assignment by permission. Prerequisites: Farm Machinery

101, 105, 110, or 201, depending upon the research problem assigned. Assistant Professor Wirt.

Farm machinery offers a broad field for original investigations. Students electing this course are assigned to one project.

Shop Practice

Associate Professor CARLSON
Instructor HOUSE
Instructor LYNCH
Instructor JONES
Instructor GRANT
Assistant YOST

Assistant PARKER
Assistant BALL
Assistant DAWSON
Assistant DOUGLAS
Assistant BUNDY

The work in the shops is planned to meet the needs of three classes of students: (1) those in the short courses in engineering and agriculture who expect to make use of the knowledge gained in their subsequent work in the shops and on the farms; (2) those in the manual-training option of the course in general science who need to secure a sufficient knowledge of the principles underlying shop work, and sufficient skill in the performance of various operations, to be able to instruct others; and (3) those in the courses in engineering whose need is to secure a thorough knowledge of the methods of performing various kinds of shop work; of the machines best suited for the different purposes; of the amount of work that may be expected of the different machines and of the workmen under different conditions.

The equipment of the shops is set forth to a certain extent below:

WOOD SHOP. This room is 40 by 90 feet; it contains 252 separate sets of tools, and benches for forty-eight students in each class. In this room is also installed an automatic band-saw filer and setter, and two grindstones driven by an individual motor.

PATTERN SHOP. This room is 45 by 81 feet and contains eight K. S. A. C. 12-in. by 32-in. safety wood turning lathes; with eight more in the process of construction; one 18-inch pattern maker's lathe, with tools and chucks; eight pattern makers' benches complete, with necessary small tools, core-box planes, electric glue-heating fixture, and other tools and apparatus for pattern work.

WOODWORKING MACHINERY ROOM. This room is 35 by 42 feet, and contains one 24-inch wood planer, one friezer, one 34-inch band saw, one jig saw, one 20-inch variety saw, one power mortiser, one sandpapering machine, one 8-inch jointer, one foot mortiser; a stock and tool room for holding the material, and small tools and gauges used in the wood shop.

MACHINE SHOP. This room is 40 by 170 feet, and contains thirteen engine lathes, as follows: One 14-inch Hendey-Norton lathe; two 14-inch Flather lathes; one 13-inch Lodge & Davis lathe; one 16-inch Lodge & Shipley combination engine and turret lathe; two 14-inch Reed lathes; five 14-inch K. S. A. C. lathes; one 28-in. by 20-ft. American lathe, equipped with blocks to raise it to 60-inch swing; one K. S. A. C. speed lathe; one Brown & Sharp No. 3-A Universal Milling Machine; one Brown & Sharpe No. 2 universal milling machine; one No. 2 Brown

& Sharpe universal grinder; one K. S. A. C. (Hendley-Norton pattern) shaper; one K. S. A. C. (Pratt & Whitney pattern) shaper; one Gray 26-in. by 6-ft. planer; one Niles 51-inch vertical turning and boring mill; one Baker Bros. key seater; one Barnes 34-inch self-feed drill press; one Rogers 12-inch sensitive drill press; two K. S. A. C. 12-inch sensitive drill presses; one K. S. A. C. (Bemis-Miles pattern) 20-inch double-traverse quick-return shaper; two Morse & Dexter valve reseating machines; one Walker universal grinder; one K. S. A. C. special drill grinder; one bolt and pipe machine, taking pipe up to two inches; one power hack saw; one Emerson direct-connected motor polishing machine; one Bignall & Keeler pipe machine, taking pipe up to eight inches; a complete set of sheet-metal worker's tools; benches and tools for fifty students, and a tool room completely stocked with the necessary tools. A time clock (Calculagraph) is installed near the machine shop office for recording the attendance of the students and workmen.

Adjacent to the machine shop is a room 18 by 20 feet, which is used as a stock and storage room for the rough and finished parts of the 1½-hp. gas engine and 12-in. by 32-in. wood-turning lathes, which are constantly in the process of construction as problem work for the students.

BLACKSMITH SHOP. This room is 50 by 100 feet and is equipped with twelve K. S. A. C. downdraft forges and thirty-three Sturtevant downdraft forges for students' use, and two large special Sturtevant forges for general use. Each forge has an anvil and a complete set of forging tools, and is supplied with forced draft and power exhaust. In addition to the general tools for a fully equipped blacksmith shop there is also installed a 12-inch K. S. A. C. sensitive drill press, punch and shear, K. S. A. C. (Erie pattern) 400-pound steam hammer, emery grinder, tire bender, tire shrinker, and a number of pieces of special apparatus built by the department.

IRON FOUNDRY. This room is 27 by 100 feet. It is equipped with a 1½-ton Colliau cupola; 4-ton, 25-foot span K. S. A. C. traveling crane; core oven, 5 by 6 by 7 feet (arranged so it can be heated with either coke or gas); one car, track and turntable; one 2-ft. by 3-ft. K. S. A. C. rumbler; one K. S. A. C. emery grinder; one K. S. A. C. molding machine; one Arcade squeezer-type molding machine; one air-driven sand riddler; one hammer core machine; an exceptionally large number of flasks, both wood and iron; ladles, and necessary small tools.

BRASS FOUNDRY. This room is 24 by 34 feet. It is equipped with one 21-in. by 36-in. brass furnace, one 11-in. by 20-in. brass furnace, crucibles, flasks, molding tubes, benches, cases, racks and necessary tools for bench and floor molding.

AMPHITHEATER. This room is 24 by 54 feet. It is adjacent to the blacksmith shop and iron and brass foundries, and is equipped with forge, anvil, forge tools, bench, molding trough and molding tools, blackboard, etc., for lectures and demonstration work.

LOCKER ROOM. This room is 36 by 40 feet. It is conveniently located and is equipped with 244 special metal lockers for the use of students

taking work in the machine shop, blacksmith shop, foundry and engineering laboratory. A portion of this is made a separate locker room and bathroom for the use of the shop foreman, and contains seven metal lockers.

COURSES IN SHOP PRACTICE

FOR UNDERGRADUATES

101. WOODWORK. Freshman year, both semesters. Laboratory, three hours. One semester credit. Prerequisite: None. Mr. Parker and Mr. Ball.

A course for engineering students, the first part of which consists of exercises to give familiarity with hand and bench tools. The latter part of the course is devoted to such work as will acquaint the student with the methods of operating the various woodworking machines.

105. WOODWORK I. Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: None. Mr. Parker and Mr. Ball.

A beginning course to give practice with the woodworking bench tools on the various common woods, and to teach the proper methods of finishing woods with stains, varnish, paint, etc. Considerable emphasis is placed upon the proper use and care of tools.

110. WOODWORK II. Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Woodwork I (Shop 105). Mr. Parker and Mr. Ball.

A continuation of Woodwork I, with practice in the use of the rabbet, router and matching planes, and with the plow dado and fillister on such work as will give the necessary practice. Considerable emphasis is laid upon the proper use and care of the tools and on the use of wood finishes.

115. WOODWORK III. Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Woodwork II (Shop 110). Mr. Parker and Mr. Ball.

A course in mill work, where practice is given on such articles as bring into use all of the woodworking machinery.

120. WOODWORKING FOR GRAMMAR GRADES. Elective, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: None. Mr. Parker and Mr. Ball.

A course designed for those who are preparing to teach manual training. This course takes up the beginning work, and the exercises given are such as would be suitable for the grammar grades.

125. WOODWORKING I FOR HIGH SCHOOLS. Elective, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Woodworking for Grammar Grades (Shop 120).

A continuation of Woodworking for Grammar Grades, with problems suitable for students in the high schools. Special attention is given to the study of woods and methods of finishing them, as well as to the use and care of tools.

130. WOODWORKING II FOR HIGH SCHOOLS. Elective, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Woodwork I for High Schools (Shop 125).

This is a continuation of Woodworking I for High Schools, with advanced work in cabinet construction by the use of woodworking machinery, and such bench work as necessary. Special emphasis is placed upon the quantity as well as the quality of the work, in order that a proper

use may be made of time. Assignments are given which cover wood-working machinery, tools and sharpening, and the drawing up of sketches for a completely equipped woodworking shop.

135. WOODTURNING. Elective, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Woodworking II for High Schools (Shop 130). Mr. Ball.

This work is such as will give the student a thorough training in handling the lathe and turning tools. Those taking this work are expected to arrange their assignments so that a portion of the time can be devoted to assisting with the teaching of the more elementary classes in the wood shop. This training will be found valuable to those who have had no teaching experience.

140. ADVANCED WOODWORK. Junior year, first semester. Laboratory, six hours, supplemented by lectures. Two semester credits. Prerequisite: Woodwork (Shop 101). Mr. Parker and Mr. Ball.

A combined course in bench and machine work in making some of the most common building details, such as porch newels and rails, plain and fancy molding, cornices, etc. The lecture work consists of a detailed study of the wood finishes, tools and machines used in building construction.

145. PATTERN MAKING. Sophomore year, second semester. Laboratory, three hours. One semester credit. Prerequisite: Foundry Practice (Shop 160). Mr. Ball.

A series of exercises embodying the principles governing the construction of plain and split patterns, including core prints and core boxes, after which practical patterns are made of machine parts.

150. FORGING I. Freshman year, both semesters and summer school. Laboratory, three hours. One semester credit. Prerequisite: None. Mr. Lynch and Mr. Bundy.

A course in the forging of iron and steel, designed to teach the principles and operations of drawing, bending, upsetting, welding, twisting, splitting, and punching, and the proper methods of making forgings and tools. Tools required: a two-foot rule and a pair of five-inch outside calipers.

155. FORGING II. Sophomore year, both semesters and summer school. Laboratory, three hours. One semester credit. Prerequisite: Forging I (Shop 150). Mr. Lynch and Mr. Bundy.

Advanced work in the forging of iron and in the manufacture of steel tools. Instruction is given in hardening, tempering, casehardening and annealing, heat treating and testing of tool steels. Tools required: Same as in Forging I.

160. FOUNDRY PRACTICE. Sophomore year, both semesters. Laboratory, three hours. One semester credit. Prerequisite: None. Mr. Grant.

Practice is given in floor, bench and machine molding, in core making, and in casting in iron, copper, brass, and special alloys. A study is also made of modern foundry construction, equipment, materials, and methods.

165. METALLURGY. Sophomore year, second semester. Lectures and recitations, two hours. Two semester credits. Professor Carlson.

A course dealing with the manufacture and use of iron, steel, copper and their alloys, as well as with their proper selection and use in the manufacturing industries.

170. MACHINE TOOL WORK I. Junior or senior year, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Foundry Practice (Shop 160). Mr. Jones and Mr. Yost.

Practice is given in chipping, filing, shaper and planer work, scraping, drilling, and turning on the lathe. Tools required: A four-inch scale, or B. & S. slide caliper, one pair five-inch outside calipers, one pair five-inch inside calipers, one center drill, and one B. & S. center gage.

190. SEMINAR. Sophomore, junior and senior years, both semesters. Professor Carlson, honorary chairman.

The A. S. M. E. seminar meets every other week, alternating with the general seminar of the whole engineering student body. In the A. S. M. E. seminar subjects are taken up which relate to the work of the mechanical engineer. Talks are given by mechanical engineers, and discussions and reviews of the A. S. M. E. Journal and other engineering magazines are given by students.

In the general seminar, lectures are given by practicing engineers and by members of the engineering faculty, on topics of general interest to engineering students.

195. THESIS. Senior year, continuing through both semesters. Professor Carlson.

A thesis gives an opportunity for the student to work out problems of interest and value to himself under his own initiative, but subject to the supervision of the instructors. The shops have ample facilities for carrying on work of this character, of a constructive or investigative nature, and every possible aid is given those who select theses along this line.

FOR GRADUATES AND UNDERGRADUATES

205. ADVANCED PATTERN MAKING. Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Pattern Making (Shop 145). Professor Carlson and Mr. Ball.

A continuation of Pattern Making, with more advanced work, including match-board work, patterns for molding machines, and general pattern work.

210. ADVANCED FOUNDRY PRACTICE. Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Foundry Practice (Shop 160). Professor Carlson and Mr. Grant.

A continuation of Foundry Practice, including green and dry sand and loam molding. A study is also made of the different mixtures of iron, of handling the cupola and brass furnace, of difficult molding and core work, and of making steel castings.

215. FORGING III. Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Forging II (Shop 155). Mr. Lynch and Mr. Bundy.

A continuation of Forging II, with more advanced work in the working of iron and steel and in studying the effect of the different heat treatments upon steel. Opportunity will be given for work with the oxacetylene and thermit processes of welding.

220. FORGING IV. Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Forging III (Shop 215). Professor Carlson and Mr. Lynch.

Opportunity is offered for work in steel and iron, oxacetylene welding, steam hammer work, drop forge work and other lines, depending upon the object in view and the previous training of the student.

225. MACHINE TOOL WORK II. Junior year, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Machine Tool Work I (Shop 170). Professor Carlson, Mr. Jones, and Mr. Yost.

Progressive problems in turning and calipering, in boring, in reaming and taper turning and in threading on the lathe, exercise in chucking, the use of forming tools, and gear cutting. A study is made of cutting edges and tool adjustments best suited to the different metals, and of cutting speeds and feeds.

230. MACHINE TOOL WORK III. Senior year, both semesters and summer school. Laboratory, three hours. One semester credit. Prerequisite: Machine Tool Work III (Shop 225). Professor Carlson, Mr. Jones, and Mr. Yost.

This course takes up work on the turret lathe, boring mill and grinder. Practical work is also given with the jigs and templets, and a study is made of the rapid production of duplicate parts, of belts, lacings and other methods of belt connection, and of compound and differential indexing.

235. MACHINE TOOL WORK IV. Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Machine Tool Work III (Shop 230). Professor Carlson and Mr. Jones.

The time of this course is devoted to the shop phases of efficiency engineering, including time studies and routing of materials. Complete machines and machine parts are constructed from drawings and blue prints. A study is made of the different machine tools from assigned catalogue work, with regard to the economical and efficient production of different classes of products.

240. MACHINE TOOL WORK V. Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Machine Tool Work IV (Shop 235). Professor Carlson and Mr. Jones.

This course is devoted entirely to a systematic study to determine the various time elements that are required in the efficient production of standard machine parts which are being made in the shops.

245, 250. FACTORY ENGINEERING. Senior year, first semester. Lectures and recitations, one hour; drafting room, three hours. Two semester credits. Prerequisites: Business Organization (Econ. 204) and Applied Mechanics II (Ap. Mech. 110). Professor Carlson.

A course dealing with the problems of the factory executive such as the selection, installation and arrangement of direct and indirect equipment, the standardization of machines and tools, stock and store methods, production orders, routing and dispatching, time study and rate setting, instruction and operation cards, wage systems, cost systems and the various factors that have to do with the design and control of factories.

255. FACTORY DESIGN. Senior year, second semester. Drafting, six hours. Two semester credits. Prerequisite: Factory Engineering (Shop 245, 250). Professor Carlson.

The knowledge gained in the shops and laboratories and in the course in factory engineering is used in the design of a complete factory.

260. ADVANCED SHOP PRACTICE. Elective, first semester. Laboratory, nine hours. Three semester credits. Professor Carlson and assistants.

Opportunity is offered those having the necessary preliminary training to specialize to a limited degree along certain lines of Shop Practice, such as the heat treatment of steel, oxacetylene welding, jig and die work, cutting speeds and feeds, shop management and systems.

265. SHOP PRACTICE RESEARCH. Elective, both semesters. Laboratory, nine hours. Three semester credits. Professor Carlson.

A course for those who wish to investigate some phase of shop practice work in which they are greatly interested. The wonderful improvements in the methods of present-day production amply justify investigative work along this line, and every possible aid will be accorded those wishing to take this work.

Steam and Gas Engineering

Professor POTTER
Assistant Professor SIMMERING
Instructor SANDERS
Instructor COLLINS

Assistant KNICKERBOCKER
Assistant BUCK
Fellow HOBBS

The object of the instruction in this department is to give to the student the fundamental principles underlying the design, construction, selection, operation and testing of steam boilers, steam engines, and steam turbines; gas producers; gas and petroleum engines; compressed-air and refrigerating machinery; condensers and evaporators. These subjects are developed by courses in engineering thermodynamics and in steam and gas engineering, and are followed in the fourth year by courses in power-plant engineering, in refrigeration, and in heating and ventilation. The classroom instruction of every course consists of lectures and recitations, which are paralleled by work in the drafting room and laboratory, and supplemented by numerous practical problems, trade catalogues, notes, and inspection trips requiring written reports.

STEAM ENGINEERING LABORATORY

In addition to the equipment installed especially for experimental purposes, all the heating, power, ventilating, and pumping equipment of the College subserves the further purpose of experimental work.

There are available for boiler tests three 125-horsepower high-pressure fire-tube boilers equipped with under-feed, chain-gate, and side-feed stokers; two high-pressure water-tube 250-horsepower boilers, one being equipped with a Roney stoker and the other with an under-feed stoker. Besides the five high-pressure boilers, there are eight low-pressure boilers equipped with under-feed stokers. All of these boilers have full equipment of auxiliaries and are provided with pyrometers, draft gauges, flue-gas samplers, and other instruments for research and laboratory work.

The steam engineering laboratory contains twelve steam engines with different types of valve gears, including plain slide valves, balanced valves, double valves, piston valves, Corliss valves. These engines range in power from 6 to 250-horsepower. There are also three steam turbines equipped with surface condensers, dry vacuum pumps, wet vacuum pumps, and circulating pumps. A compound reciprocating steam engine is also equipped so that it can be operated condensing or noncondensing. The engines in this laboratory are equipped with electric generators or with absorption brakes.

Two ammonia refrigerating machines are available only for laboratory work and a third refrigerating machine, which serves the College, is also used for tests and research in refrigeration. One of the laboratory refrigerating machines serves a thermal testing room, equipped for low temperature experiments.

The laboratory is also provided with various types of steam pumps, steam traps, steam and ammonia indicators, gauges, injectors, planimeters, pyrometers, and apparatus for testing gauges, indicators, and lubricants.

GAS ENGINEERING LABORATORY

The apparatus for gas engineering instruction and research includes a Smith suction gas producer which supplies gas to a 25-horsepower Foos gas engine. This gas engine is equipped with the necessary cylinder heads and other auxiliaries, so that it can be operated with producer gas, natural gas, water gas and with light and heavy liquid fuels. Besides the Foos experimental engine, the gas engine laboratory includes about thirty different sizes and makes of gas and oil engines, ten of which belong to the College and the others are loaned by manufacturers for teaching and for research work.

A Westinghouse air-pump, a complete compressed-air plant driven by an electric motor, and several fans, are available for experiments with air.

The gas engineering laboratory also includes several types of coal calorimeters, a Junkers and a Sargeant gas calorimeter, apparatus for proximate analysis of fuels, oil-testing equipment, a bearing tester, several different types of pyrometers, a variety of gas-engine indicators, Venturi and Pitot tubes.

The automobile equipment includes a gasoline auto-truck, a steam automobile, several types of automobile cylinders, differentials, transmissions, clutches, carburetors, magnetos, starting devices, and miscellaneous automobile parts.

TRACTION ENGINE LABORATORY

This laboratory is housed in a separate building and has at all times several different types of oil and steam traction engines, two belonging to the College and the others loaned by manufacturers. During the College year 1916-1917 this laboratory had fifteen different types of traction engines for classroom use. The equipment of this laboratory includes recording and registering dynamometers, traction-engine test block and small instruments for traction-engine testing.

COURSES IN STEAM AND GAS ENGINEERING

FOR UNDERGRADUATES

101. STEAM AND GAS ENGINEERING I RECITATION. Junior or senior year, first semester. Lectures and recitations, four hours. Four semester credits. Prerequisites: Kinematics (Ap. Mech. 180) and Calculus II (Math. 116). Professor Potter and Assistant Professor Simmering.

A study of heat power engineering, including steam engines and valve gears; the thermodynamics of gases and vapors; gas and vapor cycles. Texts: Furman's *Valve Gears*, Vol. I, and Hirshfeld and Barnard's *Heat Power Engineering*.

105. STEAM AND GAS ENGINEERING I LABORATORY. Junior or senior year, first semester. Laboratory, three hours. One semester credit. Taken with Steam and Gas Engineering I Recitation. Assistant Professor Simmering and Assistant Buck.

The study and calibration of steam gauges, indicators and planimeters; valve setting and steam engine operations; study of calorimeters, flow meters, and feed-water heaters; determination of the indicated and brake horsepowers, mechanical efficiency and the steam con-

sumption of high-speed automatic cut-off, Corliss, simple and compound engines; tests of DeLaval, Kerr and Terry steam turbines. Text: Carpenter and Diederichs' *Experimental Engineering* is used in this and subsequent laboratory courses.

110. STEAM AND GAS ENGINEERING II RECITATION. Junior or senior year, second semester. Lectures and recitations, three hours. Three semester credits. Prerequisite: Steam and Gas Engineering I. Professor Potter and Assistant Professor Simmering.

A continuation of the study of heat power engineering, including steam turbines; internal-combustion engines; fuels and combustion; boilers and boiler auxiliaries; gas producers; natural and artificial gas; condensers; evaporators; compressed air and refrigerating machinery. Texts: Hirshfeld and Barnard's *Heat Power Engineering*, and Furman's *Valve Gears*, Vol. II.

115. STEAM AND GAS ENGINEERING II LABORATORY. Junior or senior year, second semester. Laboratory, three hours. One semester credit. Taken with Steam and Gas Engineering II Recitation. Assistant Professor Simmering and Assistant Buck.

The proximate analysis of coal; determination of the calorific values of solid, liquid and gaseous fuels; evaporative tests of steam boilers; testing of internal combustion engines, including a study of the various auxiliaries for gas and oil engines; tests of compressed air and refrigerating machinery.

120. STEAM AND GAS ENGINEERING C RECITATION. Junior or senior year, second semester. Lectures and recitations, two hours. Two semester credits. Prerequisites: Engineering Physics II (Physics 212) and Calculus II (Math. 116). Assistant Professor Simmering.

A descriptive study of steam boilers, steam engines, steam turbines, gas and oil engines, including the various auxiliaries. Text: Allen and Bursley's *Heat Engines*.

125. STEAM AND GAS ENGINEERING C LABORATORY. Junior or senior year, second semester. Laboratory, three hours. One semester credit. Taken with Steam and Gas Engineering C Recitation. Assistant Professor Simmering and assistant.

The study and calibration of steam gauges, indicators and planimeters; calorimeters; evaporative tests of steam boilers; determination of the heating value of liquid and gaseous fuels; tests of steam engines; valve setting; tests of steam turbines; tests of internal-combustion engines; operation and testing of refrigerating machines.

140. FARM MOTORS I RECITATION. Junior year, both semesters, and summer school. Lectures and recitations, two hours. Two semester credits. Mr. Collins and assistants.

A descriptive study of steam engines, boilers, internal-combustion engines, automobiles and traction engines, with special reference to their utilization on the farm.

145. FARM MOTORS I LABORATORY. Junior year, both semesters, and summer school. Laboratory, three hours. One semester credit. Mr. Collins and assistants.

A study of steam gauges, lubricators; construction of steam and internal-combustion engines; valve setting; operation and testing of steam engines, internal-combustion engines and traction engines.

150. FARM MOTORS II RECITATION. Junior year, both semesters, and summer school. Lectures and recitations, two hours. Two semester credits. Prerequisite: Farm Motors I. Mr. Sanders and Mr. Buck.

A continuation of the study of farm motors, including water motors, windmills, electric motors and traction engines; carburetion and ignition. Text: Potter's *Farm Motors* and notes.

155. FARM MOTORS II LABORATORY. Junior year, both semesters, and summer school. Laboratory, three hours. One semester credit. Mr. Sanders and assistants.

A study is made of the details of construction of steam and oil traction engines; operation and testing of steam and oil traction engines, with special reference to belt, road and field work.

170. DAIRY REFRIGERATION RECITATION. Elective, first semester. Lectures and recitations, one hour. One semester credit. Assistant Professor Simmering.

The elementary theory and principles of operation of various refrigerating and ice-making machinery and of cold storage, with special reference to the dairy industry, are considered.

175. DAIRY REFRIGERATION LABORATORY. Elective, first semester. Laboratory work, three hours. One semester credit. Assistant Professor Simmering and Mr. Buck.

Study and operation of various types of refrigeration systems; steam-engine operation and testing of refrigeration machines.

180. HEATING AND VENTILATION A. Senior year, second semester. Lectures and recitations, two hours. Two semester credits. Prerequisite: Engineering Physics II. Assistant Professor Simmering.

The fundamental principles of heating and ventilation are studied. Special attention is given to the application of the various systems of heating and ventilation for dwellings and public buildings.

190. ENGINEERING LECTURES. Freshman year, continuing through both semesters. Lectures, one hour a week. Dean Potter and other members of the engineering faculty, and practicing engineers.

Lectures designed to acquaint students beginning the study of engineering and architecture with the fundamental principles of their professions and to give them a general survey of the engineering field.

195. THESIS. Senior year, continuing through both semesters. Professor Potter and Assistant Professor Simmering.

The laboratories of the department are well furnished with apparatus suitable for experimental and research work in the field of heat-power engineering. The subject of the investigation should be selected in consultation with the head of the department, at the beginning of the first semester.

FOR GRADUATES AND UNDERGRADUATES.

201. POWER-PLANT ENGINEERING RECITATION. Senior year, first semester. Lectures and recitations, three hours. Three semester credits. Prerequisite: Steam and Gas Engineering II. Professor Potter and Assistant Professor Simmering.

A detailed study is made of the complete power plant including steam-electric, gas-electric and hydro-electric plants. Text: Gebhardt's *Steam Power Plant Engineering* and notes.

205. POWER-PLANT ENGINEERING LABORATORY. Senior year, first semester. Laboratory, six hours. Two semester credits. Taken with Power-plant Engineering Recitation. Assistant Professor Simmering.

The first half of the semester will be devoted to complete power-plant testing; application of Clayton's Analysis to steam-engine performance; operation of gas producers, and advanced laboratory work on internal combustion engines. The remainder of the time will be devoted to the design of a complete power plant.

210. REFRIGERATION, HEATING, AND VENTILATION RECITATION. Senior year, second semester. Lectures and recitations, two hours. Two semester credits. Prerequisite: Steam and Gas Engineering II. Assistant Professor Simmering.

This course is planned to acquaint the student with the fundamental principles of refrigerating systems, and the application of refrigeration to ice making, cold storage, and the cooling of air liquids and solids; also the fundamental principles of heating and ventilation, including the direct and indirect systems, hot-air, hot-water and steam systems of heating. Text: Hoffman's *Heating and Ventilation* and notes on refrigeration.

215. REFRIGERATION, HEATING, AND VENTILATION LABORATORY. Senior year, second semester. Laboratory, three hours. One semester credit. Taken with Refrigeration, Heating and Ventilation. Assistant Professor Simmering.

The laboratory work will include tests of refrigerating machinery, and of the thermal conductivity of insulating materials; tests on fans and blowers, radiators and house-heating boilers. The remainder of the time will be devoted to the design of heating and ventilating systems for buildings.

FOR GRADUATES

301. ADVANCED THERMODYNAMICS. Elective, first or second semester. Lectures and recitations, two hours. Two semester credits. Professor Potter and Assistant Professor Simmering.

A study is made of the advanced phases of engineering thermodynamics, including research work along fundamental properties of gases and vapors. Reports are made of recent investigations along thermodynamic lines.

305. ENGINEERING RESEARCH. Elective, first or second semester. One semester credit for each three hours of laboratory work. Professor Potter and Assistant Professor Simmering.

The laboratory work is correlated with the work of the Engineering Experiment Station. Investigations on lubricants, fuels, combustion, internal-combustion engines, steam engines, steam turbines, steam boilers, gas producers, refrigeration, heating and ventilation, compressed air and similar subjects are carried on.

Short Courses in Mechanic Arts

The following short courses are intended for men who wish to gain a practical knowledge of the work indicated. The Short Course in Shop Work will be offered twice during the year; the first term beginning the fourth Monday in October and continuing eight weeks, the second term beginning January 7, 1918, and continuing eight weeks. The other short courses will be given but once a year, and will start January 7, 1918.

Short Course in Traction Engines

This course is intended for those who have not the time nor the means to take any of the regular engineering courses in the College, but who wish to obtain a practical working knowledge of stationary and traction steam and gas engines. The work of the course is shown in the following tabulation:

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR	SECOND YEAR
Gas Engines	Gas Engines and Automobiles
Steam and Gas 1, 2.... 3(1-4)	Steam and Gas 5..... 4(0-8)
Gas Traction Engines I	Gas Traction Engines II
Steam and Gas 11, 12... 5(1-8)	Steam and Gas 15..... 4(0-8)
Power Farming Machinery	
Farm Mach. 5..... 2(0-4)	
Blacksmithing I	Blacksmithing II
Shop 1 2(0-4)	Shop 3 2(0-4)
Machine Shop I	Machine Shop II and III
Shop 23 2(0-4)	Shop 24, 25..... 4(0-8)
Mechanical Drawing I	Carburetion and Ignition
Ap. Mech. 1..... 2(0-4)	Steam and Gas 23..... 4(4-0)
Iron and Steel	
Shop 13 1(1-0)	
Special Lectures	
Steam and Gas 25..... 1(1-0)	
Electives, 3 to 6 credits from the following list must be taken:	Electives, 2 to 4 credits from the following list must be taken:
Steam Traction Engines I	Steam Traction Engines II
Steam and Gas 19..... 4(0-8)	Steam and Gas 21..... 2(0-4)
Foundry Work I	Mechanical Drawing II
Shop 9 2(0-4)	Ap. Mech. 5..... 2(0-4)
Machine Shop II and III	Machine Shop IV
Shop 24, 25..... 4(0-8)	Shop 26 2(0-4)
Blacksmithing II	Blacksmithing III
Shop 3 2(0-4)	Shop 5 2(0-4)
Electricity	Carpentry II
Elect. Engr. 1..... 2(2-0)	Shop 17 2(0-4)
Concrete Construction	Concrete Construction
Ap. Mech. 20, 25..... 4(2-4)	Ap. Mech. 20, 25..... 4(2-4)
Carpentry I	
Shop 15 2(0-4)	
Live Stock	
An. Husb. 3(1-4)	

Short Course in Shop Work

This is a course designed for men who wish to gain a working knowledge of machines, tools and methods used in commercial and repair shops. The subjects taught are shown below.

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR		SECOND YEAR	
Blacksmithing I and II		Blacksmithing III	
Shop 1, 3.....	4(0-8)	Shop 5	2(0-4)
Foundry Work I		Foundry Work II	
Shop 9	2(0-4)	Shop 11	2(0-4)
Machine Shop I, II and III		Machine Shop IV and V	
Shop 23, 24, 25.....	6(0-12)	Shop 26, 27.....	4(0-8)
Carpentry I		Pattern Work	
Shop 15	2(0-4)	Shop 21	2(0-4)
Gas Engines		Gas Engines and Automobiles	
Steam and Gas 1, 2....	3(1-4)	Steam and Gas 5.....	4(0-8)
Mechanical Drawing I		Mechanical Drawing II	
Ap. Mech. 1.....	2(0-4)	Ap. Mech. 5.....	2(0-4)
Iron and Steel			
Shop 13	1(1-0)		
Special Lectures			
Steam and Gas 25.....	1(1-0)		
Electives, 2 credits from the following list may be taken:		Electives, 3 to 6 credits from the following list must be taken:	
Machine Shop IV		Machine Shop VI and VII	
Shop 26	2(0-4)	Shop 28, 29.....	4(0-8)
Power Farming Machinery		Carpentry III	
Farm Mach. 5.....	2(0-4)	Shop 19	2(0-4)
Carpentry II		Blacksmithing IV	
Shop 17	2(0-4)	Shop 7	2(0-4)
Traction Engines		Concrete Construction	
Steam and Gas 17.....	2(0-4)	Ap. Mech. 20, 25.....	4(2-4)
		Gas Traction Engines I	
		Steam and Gas 11, 12..	5(1-8)
		Electricity	
		Elect. Engr. 1.....	2(2-0)
		Steam Traction Engines I	
		Steam and Gas 19.....	4(0-8)

Short Course in Road Building

This course, a tabulation of which is shown below, is designed for county engineers and surveyors. This work can not be given unless as many as twelve men apply for it. All those who contemplate taking this work are, therefore, advised to write to the head of the Department of Civil and Highway Engineering of their intention at least one month prior to the opening of the course. If it is probable that there will not be a sufficient number of applicants to justify the College in giving the course, all prospective students can then be notified and the expense of a trip to Manhattan and the resultant disappointment can be avoided. Applicants for the course must possess a working knowledge of the elements of algebra, trigonometry and physics.

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

Surveying	
C. E. 1, 2.....	4(2-4)
Highway Engineering	
C. E. 5.....	3(3-0)
Road Machinery and Materials	
Ap. Mech. 10.....	3(0-6)
Bridge and Culvert Construction	
C. E. 10, 11.....	5(3-4)
Concrete Construction	
Ap. Mech. 20, 25.....	4(2-4)
Mechanical Drawing I	
Ap. Mech. 1.....	2(0-4)

Subjects Taught in Mechanic Arts Short Courses**ELECTRICITY**

Elec. Engr. 1. ELECTRICITY. Recitations or lectures two hours. Two credits. Mr. Biorkman.

An elementary course in the practical applications of electricity to the electrical machines and apparatus which are now to be found in the small isolated plant, the rural or small town house and store, the electrical equipment of automobiles (with the exception of the ignition), and other electrical devices concerning which the general public now should be informed. This course will treat of the care and operation of dynamos, motors and generators; of storage batteries, lead and nickel, iron or Edison types, for both stationary and portable use; of the proper methods of wiring houses and other buildings, and the different classes of approved material for this purpose; methods of outside wiring between buildings; and general uses of electric light and power.

FARM MACHINERY

Farm Mach. 5. POWER FARMING MACHINERY. Laboratory, four hours. Two credits. Assistant Professor Wirt.

This course takes up the study of those machines that are used with the tractor, including the engine plows, feed mills, corn shellers, hay balers, ensilage cutters, husker-shredders, and threshing machines.

MECHANICAL DRAWING AND MATERIALS OF CONSTRUCTION

Ap. Mech. 1. MECHANICAL DRAWING I. Drafting-room practice, four hours. Two credits. Assistant Professor Pearce, Mr. Robert, and assistants.

An elementary course in mechanical drawing designed to teach students to read and interpret simple working drawings, and to make working drawings of simple objects or designs. Some attention is devoted to the use of the triangle, T-square and drawing instruments, and to the principles of orthographic projection.

Ap. Mech. 5. MECHANICAL DRAWING II. Drafting-room practice, four hours. Two credits. Assistant Professor Pearce, Mr. Robert, and assistants.

A continuation of work of Mechanical Drawing I, with practice in the making of working sketches and drawings of simple machine parts from the objects.

Ap. Mech. 10. ROAD MACHINERY AND MATERIALS. Laboratory practice, six hours. Three credits. Professor Conrad and Assistant Professor Wendt.

A study of the use of various road-building machines and testing of macadam and bituminous road materials.

Ap. Mech. 20. CONCRETE CONSTRUCTION RECITATION. Class work, two hours. Two credits. Assistant Professor Wendt.

Instruction is given in the principles governing the selection and preparation of materials, the proper proportioning of materials for different conditions, the construction of forms, mixing and handling concrete, elementary reinforced concrete construction, finishing concrete surfaces, stucco and plaster work, and waterproofing and coloring concrete. A brief study is made of the application of these principles to the making of concrete foundations, building blocks and bricks, posts, sidewalks, floors, tanks, cisterns, silos and bridges and culverts. Text: Seaton's *Concrete Construction for Rural Communities*.

Ap. Mech. 25. CONCRETE CONSTRUCTION LABORATORY. Four hours. Two credits. Assistant Professor Wendt and assistants.

Laboratory and field work is given in hand and machine mixing and handling of concrete and in the construction of forms for such objects as machine and building foundations, floors, sidewalks, fence posts and building blocks. Tests are made on concrete cylinders and beams to illustrate the effect of different methods of treatment on the strength and reliability of plain and reinforced concrete.

ROAD BUILDING.

C. E. 1. SURVEYING RECITATION. Class work, two hours. Two credits. Assistant Professor Frazier.

This is a brief course in the care and use of engineers' surveying instruments. The greater part of the time is devoted to exercises and practical problems involving the use of the transit and level.

C. E. 2. SURVEYING LABORATORY. Field and drafting-room work, four hours. Two credits. To accompany Surveying Recitation (C. E. 1). Assistant Professor Frazier.

C. E. 5. HIGHWAY ENGINEERING. Class work, three hours. Three credits. Mr. ———.

The work in the classroom is devoted to a study of the theory and practice of economic highway and pavement construction and mainte-

nance, including a study of the needs of traffic, of its effect on the road surface, and of the materials of construction.

C. E. 10. BRIDGE AND CULVERT CONSTRUCTION RECITATION. Class work three hours. Three credits. Professor Conrad.

This is an elementary course in the design and construction of highway bridges and culverts.

C. E. 11. BRIDGE AND CULVERT CONSTRUCTION LABORATORY. Drafting-room work, four hours. Two credits. To accompany the class work in Bridge and Culvert Construction (C. E. 10). Professor Conrad.

SHOP WORK.

Shop 1. BLACKSMITHING I. Laboratory, four hours. Two credits. Mr. Lynch and Mr. Bundy.

A beginning course in forging operations, including drawing upsetting, bending, twisting, hot and cold punching, and welding, together with instructions in the use of the fire, and in the selection and care of tools. The exercises given are such as to be of practical value to the man on the farm.

Shop 3. BLACKSMITHING II. Laboratory, four hours. Two credits. Prerequisite: Blacksmithing I (Shop 1). Mr. Lynch and Mr. Bundy.

A continuation of Blacksmithing I, with additional exercises in the working of iron and machine steel. Some practice will be given in hardening and tempering tool steel, in making some of the tools used in the shops, and in plow work.

Shop 5. BLACKSMITHING III. Laboratory, four hours. Two credits. Prerequisite: Blacksmithing II (Shop 3). Mr. Lynch and Mr. Bundy.

More advanced work in iron and steel forging, plow work and blacksmithing repair work.

Shop 7. BLACKSMITHING IV. Laboratory, four hours. Two credits. Prerequisite: Blacksmithing III (Shop 5). Mr. Lynch and Mr. Bundy.

A continuation of Blacksmithing III, with more difficult work.

Shop 9. FOUNDRY WORK I. Laboratory, four hours. Two credits. Mr. Grant.

This course consists of bench and floor molding with a great variety of patterns and different kinds of sand and facings; also of open sand work, sweep molding, machine molding, core making, setting of cores, gates and risers, and casting in different materials. Special emphasis in all cases is laid upon the practical side of the work.

Shop 11. FOUNDRY WORK II. Laboratory four hours. Two credits. Prerequisite: Foundry Work I (Shop 9). Mr. Grant.

A continuation of Foundry Work I, with instruction and practice in making brass, copper, aluminum and steel castings.

Shop 13. IRON AND STEEL. Lectures and recitations, one hour. One credit. Professor Carlson.

An elementary course dealing with the manufacture and use of iron, steel and other metals used in machine construction.

Shop 15. CARPENTRY I. Laboratory, four hours. Two credits. Mr. Parker and Mr. Ball.

A practical course in woodworking to give an understanding of the proper use and care of tools and material. The work includes making tool boxes, singletrees, doubletrees, feed boxes, wheelbarrows, porch swings and other similar objects. All work is done from blue prints and drawings.

Shop 17. CARPENTRY II. Laboratory, four hours. Two credits. Prerequisite: Carpentry I (Shop 15). Mr. Parker and Mr. Ball.

A continuation of Carpentry I, with considerable work with paints, varnishes and wood finishes. Some practice is given with the square as used for cutting rafters, in framing operations, and in other work especially useful to the man on the farm.

Shop 19. CARPENTRY III. Laboratory, four hours. Two credits. Prerequisite: Carpentry II (Shop 17). Mr. Parker and Mr. Ball.

Advanced carpentry with some practice on the woodworking machinery and woodturning lathes.

Shop 21. PATTERN WORK. Laboratory, four hours. Two credits. Prerequisite: Carpentry II (Shop 17). Mr. Ball.

A course for shop mechanics who wish to become acquainted with the principles of pattern construction in wood.

Shop 23, 24, 25, 26, 27, 28, 29. MACHINE SHOP I TO VII. Laboratory, four hours in each course. Two credits in each course. Mr. Jones, Mr. Yost, and Mr. Dawson.

These courses in machine shop are such as to give a good general knowledge of a variety of machine operations, such as chipping, filing, scraping, drilling, shaper and planer work, lathe work in cutting various threads, key seating, soldering, brazing, babbitting lacing belts aligning shaftings and pulleys, cutting and threading pipe.

In order to give very practical work along this line there is being built in the shops a large number of 1½ horsepower gasoline engines and 12 in. by 32 in. woodturning lathes. Work is also given in the repair of various classes of machinery.

STEAM AND GAS ENGINES

Steam and Gas 1, 2. GAS ENGINES. Class work, one hour; laboratory, four hours. Three credits. Mr. Collins, Mr. Buck, Mr. Knickerbocker, Mr. Hobbs, and student assistants.

A study of gasoline and kerosene engines; four-stroke and two-stroke cycle engines, gas-engine fuels, carburetors, ignition systems, lubrication, governing; selection, erection and operation of stationary gasoline and kerosene engines; fundamental parts of automobiles.

Steam and Gas 5. GAS ENGINES AND AUTOMOBILES. Laboratory, eight hours. Four credits. Prerequisites: Machine Shop I (Shop 23) and Blacksmithing I (Shop 1). Mr. Collins and assistants.

A detailed study of gas-engine operation and care, with special attention to ignition systems, carburetors and testing. Automobile parts, including engines, differentials, transmissions, lubricating systems, clutches, systems of ignition, starters and carburetors; tests of ignition and equipment and carburetors.

Steam and Gas 11, 12. GAS TRACTION ENGINES I. Class work, one hour; laboratory, eight hours. Five credits. Mr. Sanders, Mr. Buck, and assistants.

A study of gas traction engines, including motors, frames, transmission systems, cooling systems, ignition systems, lubricating systems, and carburetors; operation, care, repair and testing of gas traction engines.

Steam and Gas 15. GAS TRACTION ENGINES II. Laboratory, eight hours. Four credits. Prerequisite: Gas Traction Engines I (Steam and Gas 11, 12). Mr. Sanders and assistants.

Operation, care and testing of various types of gasoline and kerosene traction engines, including belt tests, road tests and field tests.

Steam and Gas 17. TRACTION ENGINES. Laboratory, four hours. Two credits. Mr. Sanders, Mr. Collins, Mr. Buck, and assistants.

A study of gas traction engines or of steam traction engines, including care and operation of various types.

Steam and Gas 19. STEAM TRACTION ENGINES I. Laboratory, eight hours. Four credits. Mr. Sanders, Mr. Collins, and assistants.

A study of steam traction engines, including boilers, engines, pumps, injectors, gearing, clutches, reversing mechanisms and other details. Operation, care and repair of steam traction engines.

Steam and Gas 21. STEAM TRACTION ENGINES II. Laboratory, four hours. Two credits. Prerequisite: Steam Traction Engines I (Steam and Gas 19). Mr. Sanders, Mr. Collins, and assistants.

A continuation of Steam Traction Engines I, including belt and road work; tests on steam traction engines.

Steam and Gas 23. CARBURETION AND IGNITION. Class work, four hours. Four credits. Prerequisites: Gas Engines (Steam and Gas 1, 2). Mr. Buck.

A detailed study of ignition systems, fuels and carburetors as applied to traction engines and automobiles.

Steam and Gas 25. SPECIAL LECTURES. Class work, one hour. One credit.

These lectures are given by the various heads of departments and others to acquaint students with the general trend of engineering and agriculture.

Mechanic Arts in the Summer School

The College has been unable to supply from its regular graduates all of the teachers in manual training required by the high schools of the State, and in order to encourage the introduction of manual training and industrial drawing in all grades, summer courses in mechanical drawing, manual training and shop practice are offered for high-school and grade teachers.

Various courses required in the several engineering curricula are also offered in the Summer School. This enables teachers who wish to take an engineering curriculum to get a considerable start on the work during their summer vacations, and also enables College students who are irregular to make up their back courses.

For full information in regard to the courses offered, see the section of this catalogue devoted to the Summer School. A special circular giving further details of this work may be had upon application to the President of the College.

Division of Home Economics

MARY PIERCE VAN ZILE, *Dean*

The philosophy which long ruled our educational policy has been so modified by research in the sciences and by development of the industries, arts, and professions that it is now recognized that any perfected educational system must include technical training. It must encourage the student's natural desire for productive work—work in which there is a living connection between theory and practice. These broader views have been accepted by college and university men, and the result is noted in the success attained by combining industrial, technical, and scientific work with the general studies. The result is evidenced in the new courses of study for our young men and women. It is safe to assume that there are now but few educators who are so conservative as not to be in sympathy with the collegiate education in home training which is furnished by courses in home economics.

The courses are designed to fit young women to be home makers and capable women in whatever sphere their life work may be. The training is both specific and general. While it emphasizes primarily the practical and material side of life it does not stop here. The young women are constantly reminded that life is not drudgery; that technical knowledge and scientific skill even fail to include the full meaning of education in its highest sense. They are taught that any training that fails to develop harmoniously body, mind, and spirit is inadequate and incomplete. They are brought face to face with ideals as well as with actualities, and are made to see that, while skillful labor gives dignity to life, grace, refinement, and self-poise are the highest requisites for true service.

The training given is as varied as it is broad. It includes a knowledge of the laws of health, an understanding of the sanitary requirements of the home; the study of values, both absolute and relative, of the various articles (including food) that are used in the home; the wise expenditure of money, time, and energy; the scientific principles underlying the selection and preparation of food; the right care of children; and the ability to secure efficient service from others. Instruction is methodical and thorough, and is suited to the circumstances of the students. Experience shows that such training teaches contentment, industry, order, and cleanliness, and fosters a woman's independence and feeling of responsibility.

The work in home economics includes:

A four-year curriculum, leading to the degree of bachelor of science.

A three-year curriculum in the School of Agriculture.

A one-year curriculum in lunch-room management, for which a certificate is granted.

A housekeepers' course, one semester in length, for which a certificate of proficiency is granted.

CURRICULUM IN HOME ECONOMICS

The training in the four-year curriculum is both general and specific. Since scientific training is fundamental in the intelligent and successful administration of the home, strong courses in the sciences are given as a foundation for the special training in home economics. To the end that well-rounded culture may be attained, courses in English, history, economics, sociology, and psychology receive due prominence. The time of the student is about equally divided among the purely technical subjects, the fundamental sciences, and the cultural studies. The courses in the related subjects are given in the different departments of the College, while the technical courses are given by the home economics departments. In the junior and senior years opportunity is given for choice of electives, which makes it possible for students to specialize in some chosen line. To this end electives are to be chosen in groups combined logically in courses approved by the faculty or by the student's dean.

The four-year curriculum is recommended for all who desire to teach home economics, or to undertake any phase of institutional work.

The College does not assume the responsibility of insuring employment to graduates, but the latter rarely experience difficulty in obtaining remunerative positions as instructors in domestic science or in domestic art, as dietitians, or as professional housekeepers.

Curriculum in Home Economics

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
College Rhetoric I	College Rhetoric II
Eng. 101 3(3-0)	Eng. 104 3(3-0)
Chemistry HE-I	Chemistry HE-II
Chem. 103 5(3-4, 2)	Chem. 104 5(3-4, 2)
Household Physics	Foods I
Physics 101 3(3-0)	Dom. Sc. 101..... 3(1-6)
Design or Design a	Costume Design
Home Art 101 or 106... 3(1-6)	Dom. Art 106..... 3(1-6)
Survey of Home Economics	Clothing I
Home Econ. 101..... 1(1-0)	Dom. Art 101..... 2(0-6)
Library Methods	Current History
Lib. Ec. 101..... 1(1-0)	History 126 1(1-0)
Physical Training W-I	Physical Training W-II
Phy. Educ. 151..... 1(0-3)	Phy. Educ. 152..... 1(0-3)
Hygiene and Social Problems	
Home Ec. 145..... R	

CURRICULUM IN HOME ECONOMICS—*continued*

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Organic Chemistry HE	Household Microbiology
Chem. 121 5(3-4, 2)	Bact. 121 5(3-6)
German I * or French I *	German II * or French II *
Mod. Lang. 101 or 151.. 3(3-0)	Mod. Lang. 106 or 156.. 3(3-0)
General Zoölogy	Embryology and Physiology
Zoöl. 105 5(3-6)	Zoöl. 108 5(3-6)
Clothing II	Textiles
Dom. Art 111..... 3(1-6)	Dom. Art 116..... 3(2-3)
Physical Training W-III	Physical Training W-IV
Phy. Educ. 153..... 1(0-3) or	Phy. Educ. 154..... 1(0-3) or
Chorus and Musical Appreciation I	Chorus and Musical Appreciation II
Music 115 1(1-0)	Music 116 1(1-0)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
English Literature HE-I	English Literature HE-II
Eng. 177 3(3-0)	Eng. 180 3(3-0)
Human Nutrition	Dietetics
Chem. 130 3(3-0)	Dom. Sci. 201..... 5(3-6)
Foods II	Household Management
Dom. Sci. 106..... 5(3-6)	Dom. Sci. 206..... 2(2-0)
Psychology	Gardening
Educ. 101 3(3-0)	Hort. 213 3(3-0)
German Readings * or	
French Readings *	
Mod. Lang. 111 or 161.. 3(3-0) or	
Elective 2(-)	Elective 3(-)

SENIOR

FIRST SEMESTER	SECOND SEMESTER
American History I	American Government
Hist. 101 3(3-0)	Hist. 151 3(3-0)
Economics	Sociology
Econ. 101 3(3-0)	Econ. 201 3(3-0)
Sanitation and Public Health	
Dom. Sci. 211..... 3(3-0)	
Marketing and Serving	
Dom. Sci. 216..... 1(0-3)	
Elective 6(-)	Elective 10(-)

ADAPTATION CURRICULA FOR CLASSES OF 1918, 1919, AND 1920

The class of 1920 will be required to complete the sophomore year as provided in this curriculum, except that in the second semester Foods I and II (5 semester credits) and Psychology (3 semester credits) are required instead of Household Microbiology (5 semester credits) and Textiles (3 semester credits); the junior year as provided in this curriculum except that in the first semester Foods III (3 semester credits), Textiles (3 semester credits), and Elective (2 semester credits) are required instead of Foods II (5 semester credits) and Psychology (3 semester credits), and in the second semester Household Microbiology (5 semester credits) and Advanced Dressmaking or Millinery (2 semester credits) are required instead of Dietetics (5 semester credits) and Household Management (2 semester credits); the senior year as provided in this curriculum, except that in the first semester Dietetics and Therapeutics (5 semester credits) and Elective (4 semester credits) are required instead of Economics (3 semester credits) and Elective (6 semester credits), and in the second semester Household Administration (2 semester credits), Interior Decoration and Furnishings (2 semester credits), Economics (3 semester credits), and Elective (6 semester credits) are required instead of Sociology (3 semester credits) and Elective (10 semester credits).

The class of 1919 will be required to complete the junior year as provided in this curriculum, except that in the first semester Human Physiology (3 semester credits), Foods III (3 semester credits), and Advanced Dressmaking or Millinery (2 semester

* Students who have offered high-school German or French for College entrance are required to take but two semesters of foreign language. The courses which they take will depend on their preparation.

credits) are required instead of Human Nutrition (3 semester credits) and Foods II (5 semester credits), and in the second semester Human Nutrition (3 semester credits), Sanitation and Public Health (3 semester credits), Textiles (3 semester credits) and Elective (4 semester credits) are required instead of Dietetics (5 semester credits), Household Management (2 semester credits), Gardening (3 semester credits), and Elective (3 semester credits); the senior year as provided in this curriculum, except that in the first semester Dietetics and Therapeutics (5 semester credits) and Elective (4 semester credits) are required instead of Sanitation and Public Health (3 semester credits) and Elective (6 semester credits), and in the second semester Household Administration (2 semester credits), Interior Decoration and Furnishings (2 semester credits), Household Chemistry (3 semester credits), and Elective (6 semester credits), are required instead of Sociology (3 semester credits) and Elective (10 semester credits).

The class of 1918 will be required to complete the senior year as provided in this curriculum, except that in the first semester Dietetics and Therapeutics (5 semester credits) and Elective (4 semester credits) are required instead of Sanitation and Public Health (3 semester credits) and Elective (6 semester credits); and in the second semester Household Chemistry (3 semester credits), Gardening (3 semester credits), Interior Decoration and Furnishings (2 semester credits), and Elective (5 semester credits), are required instead of Sociology (3 semester credits) and Elective (10 semester credits).

Electives—Curriculum in Home Economics

FIRST SEMESTER	SECOND SEMESTER
Tailoring Dom. Art 216..... 2(0-6)	History of Costume Dom. Art 201..... 2(2-0)
Millinery Dom. Art 211..... 2(0-6)	Clothing III Dom. Art. 206..... 2(0-6)
Fine Needlework Dom. Art 221..... 2(0-6)	Art Needlework Dom. Art 226..... 2(0-6)
Institutional Management I Dom. Sci. 221..... 3(1-6)	Institutional Management II Dom. Sci. 226..... 3(2-3)
Dietetics Seminar Dom. Sci. 231..... 2(2-0)	Problems in Child Welfare Home Econ. 201..... 3(3-0)
Modern Problems of the Household Dom. Sci. 236..... 2(2-0)	Special Investigations in Foods Dom. Sci. 241..... 1(0-3)
	Home Nursing Dom. Sci. 111..... 3(3-0)
	Institutional Furnishings Home Art 203..... 3(1-6)
Interior Decoration and Furnishing Home Art 201..... 3(0-9)	Art Appreciation Home Art 206..... 2(2-0)
Organic Chemistry I Chem. 220 4(3-6)	Organic Chemistry II Chem. 221 5(3-6)
Physiological Chemistry Chem. 231 5(3-6)	Household Chemistry Chem. 265 3(1-6)
German Comedies Mod. Lang. 206..... 3(3-0)	German or French Short Stories Mod. Lang. 201 or 251.. 3(3-0)
German Classics Mod. Lang. 226..... 3(3-0)	German Prose I Mod. Lang. 221..... 3(3-0)
Scientific German I Mod. Lang. 236..... 3(3-0)	Scientific German II Mod. Lang. 241..... 3(3-0)
	Teachers' German Mod. Lang. 246..... 3(3-0)
Business English Eng. 122 3(3-0)	Methods of Teaching English Eng. 134 3(3-0)
Oral English I Eng. 123 3(3-0)	Oral English II Eng. 131 3(3-0)
Short Story Eng. 251 3(3-0)	
Nineteenth Century Literature Eng. 277 3(3-0)	American Literature Eng. 280 3(3-0)
Current Literature Eng. 282 2(2-0)	The Novel Eng. 285 2(2-0)
Educational Administration Educ. 105 3(3-0)	Educational Psychology Educ. 109 3(3-0)
History of Education Educ. 115 3(3-0)	Educational Sociology Educ. 117 2(2-0)
Home Economics Education Educ. 121 2(2-0)	Special Methods in the Teaching of Home Economics Educ. 131 ... 2(2-0)

ELECTIVES—CURRICULUM IN HOME ECONOMICS—*continued*

FIRST SEMESTER	SECOND SEMESTER
Supervised Observation and Teaching in Home Economics Educ. 141 2(0-4, 2)	Rural Education Educ. 201 3(3-0)
Harmonics Physics 222 2(2-0)	Photography Physics 120 2(1-3)
American History II Hist. 202 3(3-0)	American History III Hist. 203 3(3-0)
English History Hist. 121 3(3-0)	French History Hist. 122 3(3-0)
Modern Europe Hist. 223 3(3-0)	History of the Home Hist. 225 3(3-0)
Teachers' Course in History Hist. 127 2(2-0)	Comparative Government Hist. 251 2(2-0)
Extempore Speech I Pub. Spk. 201 2(2-0)	Extempore Speech II Pub. Spk. 202 2(2-0)
Household Entomology Ent. 106 2(2-0)	Water Purification and Sewage Disposal Bact. 221 3(1-6)
Institutional Accounting Math. 131 3(3-0)	Hygienic Bacteriology Bact. 206 4(2-6)
Rural Architecture Arch. 175 3(1-6)	Home Architecture Arch. 190 3(1-6)
Color Rendering Arch. 121 1(0-3)	Ink Rendering Arch. 118 1(0-3)
Woodwork Shop 102 1(0-3)	Clay Modeling Arch. 115 2(0-6)
School Music Methods I Music 120 2(-)	School Music Methods II Music 121 2(-)
Voice Music 130 2(2-0)	Voice Music 130 2(2-0)
Piano Music 140 2(2-0)	Piano Music 140 2(2-0)
Violin Music 135 2(2-0)	Violin Music 135 2(2-0)
History of Music Music 110 1(1-0)	History of Music Music 111 1(1-0)
Harmony Music 101 2(2-0)	Harmony Music 102 2(2-0)

NOTE.—Students intending to teach should elect the educational subjects to the extent of the requirements of the State Board of Education for the State teachers' certificate.

Students who wish to prepare for positions as institutional managers should elect Institutional Management, Institutional Furnishings, Business English, and Accounting.

Students who wish a more general training for home making or who expect later to specialize in any phase of home economics should elect Child Welfare, Home Nursing, Home Decoration, Home Architecture, Clothing III, and Household Entomology.

Domestic Art

Professor BIRDSALL
Assistant Professor COWLES
Instructor FECHT
Instructor JONES
Instructor FEWELL

Assistant FRENCH
Assistant HARRISON
Assistant HUNT
Assistant PALMER
Assistant McDONALD

The object of the instruction in domestic art is to give young women a practical knowledge of the selection of materials; the growing of textile fibers, and the processes used in their manufacture into fabrics. The course also offers instruction in hand and machine sewing; principles of drafting and designing patterns; dressmaking, tailoring, millinery, costume design, art needlework, history of costume and textiles, together with courses in education which teach how these subjects should be presented to the various grades of schools in relation to other work. The student furnishes all her materials.

COURSES IN DOMESTIC ART

FOR UNDERGRADUATES

101. CLOTHING I. Freshman year, second semester. Laboratory, six hours. Two semester credits. Professor Birdsall, Assistant Professor Cowles, Miss Palmer, Miss Jones, Miss Harrison, Miss McDonald, and Miss Fecht.

This course includes practice in hand and machine sewing; the making of simple articles, repairing garments, drafting by straight-line system, cutting and making undergarments and shirt waist. Appropriate materials and trimmings are discussed. A study of textile fibers, hygiene and the economics of clothing is made. Notebook work is an important part of the course.

106. COSTUME DESIGN. Freshman year, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Design. Miss Hunt.

This course includes a study of the principles of design, color harmony, and the application of art in dress; original problems and their direct application to design for textiles, embroideries and costumes in pencil, pen, ink and water color; costumes for reproduction in materials in direct relation to dressmaking.

111. CLOTHING II. Sophomore year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Costume Design. Professor Birdsall, Assistant Professor Cowles, Miss Fecht, Miss Harrison, Miss Jones, Miss Palmer, and Miss McDonald.

This course begins with modeling in crinoline, establishing the principal lines for measurements, and developing an appreciation of the relation of the lines of patterns to different forms. This is followed by practice in taking measurements, drafting foundation patterns by the straight-line system and making variations of all kinds from these. Emphasis is laid upon the development of one pattern from another and of the complex design from the simple. Designs are worked out upon the paper patterns and are adapted in the making of a cloth dress. Notebook work is required.

116. TEXTILES. Sophomore year, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Organic Chemistry. Miss Fecht.

This course considers the textile industry from primitive ages to modern times. The original purpose of the industry, that of furnishing covering for the body, and the later variations from this exclusive purpose, are treated, together with their effect on the composition and design of fabrics. The combination of art, science and mechanics that makes possible the elaborateness of modern textiles is given careful attention.

FOR GRADUATES AND UNDERGRADUATES

201. HISTORY OF COSTUME. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Clothing II. Miss Palmer and Miss McDonald.

This course includes a survey of ancient Egyptian, Grecian, Roman and early and modern French costumes. Its aim is to give the student information regarding these different periods. The adaptation of these costumes to present fashions is discussed.

206. CLOTHING III. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Clothing II. Miss Harrison, Miss Jones, Miss McDonald.

This course emphasizes the artistic in lines and decoration, deals with the design and adaptation of materials for the individual and occasion, and lays special stress on self-expression through dress. It also presents the use of commercial patterns, and includes practice in cutting, fitting, finishing and draping of such materials as silks, satins, chiffons and laces.

211. **MILLINERY.** Elective, first semester. Laboratory, six hours. Two semester credits. Prerequisite: Clothing II. Professor Birdsall and Miss Palmer.

This course includes a discussion of practical and artistic principles of millinery; preparation of various materials for trimming; practice in making bows, rosettes, and other forms of hat decoration; making wire and buckram frames; use of velvet, silk and straw; renovating and the use of old materials.

216. **TAILORING.** Elective, first semester. Laboratory, six hours. Two semester credits. Prerequisite: Clothing II. Professor Birdsall. This course includes discussions of materials suitable for tailored suits; sponging, cutting, fitting and finishing a coat and skirt.

221. **FINE NEEDLEWORK.** Elective, first semester. Laboratory, six hours. Two semester credits. Prerequisite: Clothing II. Miss Jones and Miss McDonald.

This course is designed to give instruction in needlework applied to hand-made garments, which include a lingerie waist, children's and infants' clothing.

226. **ART NEEDLEWORK.** Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Clothing II. Professor Birdsall and Miss Jones.

This course includes the following: stitches in crochet, knitting, cross-stitch, French embroidery, Roman cut work; their application to undergarments, waists, collars, and household linens.

Domestic Science

Professor HAGGART
Assistant Professor TREAT
Assistant Professor SHEETS
Instructor RIGNEY *
Instructor COX
Instructor SKINNER
Instructor KENNEDY

Instructor GREEN
Instructor MCCLURG
Assistant BARTHOLOMEW
Assistant CAPE
Assistant PERRY
Assistant RICHARDS

Technically, domestic science is an application of the sciences and arts to the problems of the home. Since the home is dependent upon the sciences of physics, chemistry, physiology, and bacteriology, direct use of the principles of these sciences is made in the courses in foods, dietetics, sanitation and public health, home nursing and household management. Science, applied science, and practice are presented in their proper relations, so that the student who completes these courses gains not only a theoretical knowledge of the principles underlying the profession of homemaking, but experience in applying them.

*Resigned.

COURSES IN DOMESTIC SCIENCE

FOR UNDERGRADUATES

101. FOODS I. Freshman year, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisites: Entrance credit in Physics, and Chemistry I. Professor Haggart, Misses Cox, Skinner, and Green.

The application of heat to various food principles is the basis of study in this course. The economic uses of the various foodstuffs is emphasized as is also the study of commercially prepared food products.

Laboratory.—Experimental and practical cookery illustrating this course forms the basis of the laboratory work.

106. FOODS II. Junior year, first semester. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisite: Organic Chemistry; Household Microbiology, and Human Physiology to accompany subject. Misses Cox, Skinner, McClurg, Stewart, and Cape.

This course emphasizes the classification, composition, occurrence, general properties and nutritive value of foodstuffs. Food values in relation to cost are considered. Reference work is required and the text used is Sherman's *Food Products*.

Laboratory.—Experimental cookery is continued with emphasis on the proteins, dough and batter mixtures, together with preservation of food.

111. HOME NURSING. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisites: Human Physiology and Household Microbiology. Miss Kennedy.

This course puts special emphasis on the prevention of disease and on the building up of the highest degree of health as the principal function of the home nurse. The care of the sick in the home and the rendering of first aid in emergencies are discussed and demonstrations are given.

201. DIETETICS. Junior year, second semester. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisites: Foods I and II and Human Nutrition. Assistant Professor Sheets and Miss Cape.

This course is an application of the principles of human nutrition as applied to the feeding of individuals under different physiological conditions.

206. HOUSEHOLD MANAGEMENT. Junior year, second semester. Class work, two hours. Two semester credits. Prerequisites: Foods I and II. Professor Haggart and Miss Bartholomew.

This course has been arranged for the purpose of providing instruction in the problems and technical procedures of the modern household. Such topics as the following are discussed, both from the ideal and the practical standpoint: the organization of the household; the choice of a home and its furnishings; income as determining the type of a household; the budget and its apportionment; the household accounts; household services; apportionment of time; motion studies as applied to household activities; home life and its standards. There are lectures and class discussions, and reference work is required. The students are required to live for a definite period in the practice house. *This course is an extension of the first course and is given first of the year in 1918.*

211. SANITATION AND PUBLIC HEALTH. Senior year, both semesters. Class work, three hours. Three semester credits. Prerequisite: Household Microbiology. Miss Kennedy.

This course includes a study of conditions which determine the healthfulness of the household and the application of principles of sanitation

to its care. Public health movements in relation to the home are investigated and the relation of home sanitation to the community is emphasized. Lectures are given and reference work is required.

216. **MARKETING AND SERVING.** Senior year, first semester. Laboratory, three hours. One semester credit. Prerequisite: Dietetics and Home Management. Misses Skinner and Green.

This course includes the planning, marketing, preparation and serving of meals based upon dietetic and economic standards. The application of the results of motion studies and efficient kitchen planning are emphasized.

221. **INSTITUTIONAL MANAGEMENT I.** Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Dietetics. Assistant Professor Treat and Miss Richards.

This course is a study of the food problem of institutions and includes the study of the preparation, marketing, and cost of service.

Laboratory. The preparation of food for institutional use and practical experience in the cafeteria of the Department are included in the laboratory work.

226. **INSTITUTIONAL MANAGEMENT II.** Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Institutional Management I. Assistant Professor Treat.

This course includes a study of the various types of institutions, their aim, support, control, needs, equipment and methods of purchasing supplies, together with a study of the essential characteristics, preparation and duties of the manager. Lectures are given, followed by discussions. Reference and observation work is required.

Laboratory.—Experience is given in general management of cafeteria.

231. **DIETETICS SEMINAR.** Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Dietetics. Assistant Professor Sheets.

The purpose of this course is to familiarize the student with the current literature of nutrition and the recent advancements in that science.

236. **MODERN PROBLEMS OF THE HOUSEHOLD.** Elective, first semester. Class work, two hours. Two semester credits. Prerequisites: Economics, and Home Management. Professor Haggart.

This course includes a study of the economic relations of the family and of the modern social and industrial conditions which affect it.

241. **SPECIAL INVESTIGATIONS IN FOODS.** Elective, second semester. One semester credit. Hours to be arranged. Miss Skinner.

Special problems are assigned to students for individual consideration.

Home Art

Assistant Professor HOLMAN, in Charge
Assistant AVERILL

Taste is cultivated through the impressions received in everyday surroundings and not through the occasional visits to art galleries. We are not so sensitive to discords in color and line as we are to discords in sound, because we have not trained our eyes as we have our ears. "The study of design furnishes a means of exercising and thus developing good taste in connection with the things which make up environment of everyday life and of awakening appreciation in nature and in art." Home

decoration is a study of the factors which produce beautiful surroundings that make for enjoyment and peace. Each course consists of lectures, studio laboratory work, field observation work, and reading.

COURSES IN HOME ART

FOR UNDERGRADUATES

101. COLOR AND DESIGN. Freshman year, first semester. Class work, one hour; studio work, six hours. Three semester credits. Assistant Professor Holman, Miss Averill.

A study is made of the principles which control the use of color and the selection and arrangement of elements in the production of objects themselves and in their uses as parts of a whole. Many exercises are given in which clothing and home furnishings are scored as to design. A natural motif is adapted to material, function and form.

106. COLOR AND DESIGN A. Freshman year, first semester. Studio work, nine hours. Three semester credits. To be taken as a substitute for Color and Design by students who have had color and design work in high school. Assistant Professor Holman, Miss Averill.

A further study is made of harmonies, adaptation of natural motifs, and design as applied to fabrics and other materials. Art masterpieces and articles of common use are studied according to the principles of design and color.

FOR GRADUATES AND UNDERGRADUATES

201. INTERIOR DECORATION AND FURNISHING. Elective, first semester. Studio work, nine hours. Three semester credits. Prerequisite: Color and Design. Assistant Professor Holman.

This is a study of color, form and arrangement of home furnishings. Wall coverings, carpets, pictures, furniture, etc., are discussed and studied so that the student may recognize and appreciate what is appropriate and beautiful. A study is made of fine arts, of handicrafts, and of the history of furnishings. Problems in spacing and coloring of side walls are discussed and are developed in water color and decorating materials.

203. INSTITUTIONAL FURNISHINGS. Second semester. Class work, one hour; laboratory, six hours. Three semester credits. Assistant Professor Holman.

A study is made of the fundamental principles of design, including color, form, and arrangement. These principles are applied to problems involving the selection and use of the following: wall, floors, furniture, finishes, coverings, linen, china, and silver.

206. ART APPRECIATION. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Design. Assistant Professor Holman.

A general survey is made of art periods as an index to what the art quality is. An examination is made of the religious, political, and social aspects of art expression. Architecture, furniture, textiles, sculpture, pictures, and the lesser art objects are compared as to their art quality. The modern fields of landscape, architecture, furnishings, clothing, advertising, etc., are surveyed. The principles controlling art expression are applied to these modern fields of life.

Home Economics

Dean VAN ZILE
Assistant Professor HALM

In the general field of home economics there are certain subjects falling into the well-defined fields of domestic art, domestic science, and home art. These have been described in foregoing sections. There are also certain larger and more general subjects which do not fall within these groups. These are discussed, in part at least, in the courses outlined below.

COURSES IN HOME ECONOMICS

FOR UNDERGRADUATES

101. THE SURVEY OF HOME ECONOMICS. Freshman year, both semesters. Class work, one hour. One semester credit. Dean Van Zile.

The course deals with the problems of the development of education for women, the place of home economics training, different phases of the work, the practical and educational purposes in its teaching, and the study of the different vocations in the field of home economics.

Educ. 121. HOME ECONOMICS EDUCATION. Elective, first semester. Class work, two hours. Two semester credits. Assistant Professor Halm.

See the work outlined under Education. This course is there described in detail.

Educ. 131. SPECIAL METHODS IN THE TEACHING OF HOME ECONOMICS. Elective, second semester. Class work, two hours. Two semester credits. Assistant Professor Halm.

See the work outlined under Education. This course is there described in detail.

Educ. 141. SUPERVISED OBSERVATION AND TEACHING IN HOME ECONOMICS. Elective, both semesters. Laboratory work, six hours. Three semester credits. Assistant Professor Halm.

See the work outlined under Education. This course is there described in detail.

145. HYGIENE AND SOCIAL PROBLEMS W. Freshman year, both semesters. Lecture, one hour. No credit. Dean Van Zile.

In these lectures, in addition to the problems of hygiene as applied to individual health, the biological truths that lead to serious, respectful consideration of social and sex hygiene are presented. Attendance is required of all young men during one semester of their first year in college.

201. PROBLEMS OF CHILD WELFARE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: Physiology and Psychology. Dean Van Zile.

A study is made of the rational care of the child and of the principles of child welfare. It includes the factors that influence physical fitness, the daily routine of the infant, and the constructive and preventive measures in physical and mental development of the child.

Housekeepers' Course in Home Economics

There are large numbers of young women who, from lack of time, are unable to take an extended course, but who recognize the need for special training in home making. The twentieth century demands of home managers an understanding of the sanitary requirements of the home, a knowledge of values, absolute and relative, of the articles used in the house, quick attention to details, good judgment in buying, and a ready adaptation of means to the end in view. The purpose of the housekeepers' course is to furnish this training. The teaching in this course is no less accurate than in the regular course, but is necessarily different. Given to students without scientific training, the instruction must be more largely a presentation of facts, without an elaboration of the underlying principles. The work is intensely practical, and the hundreds of young women who take this course go back to their homes with a broader view of life, and a knowledge and training that will enable them to meet their responsibilities. The course is given each semester.

REQUIREMENTS FOR ADMISSION.

Young women between the ages of eighteen and twenty-one are admitted upon presentation of common-school diploma, grammar-school certificate, or high-school diploma. Young women over twenty-one years of age are admitted without examination.

HOUSEKEEPER'S COURSE

Cookery	Floriculture
4 (0-12)	2 (2-0)
Sewing	Design in the Home and in Clothing
4 (0-12)	2 (0-6)
Hygiene	Housewifery
2 (2-0)	1 (0-3)

1. COOKERY. Both semesters. Laboratory, twelve hours.

Stoves, stove construction, stove management and fuels are the first topics considered, and this discussion is followed by experiments illustrating the effect of heat upon starch and proteins. The necessary elementary principles involved are then applied to the cooking of cereals, vegetables, beverages, breads, meats, soups, simple cake mixtures and puddings, and to the canning and preserving of fruits and vegetables. Special attention is given to the planning and serving of meals.

2. SEWING. Both semesters. Laboratory, twelve hours.

This course includes practice in hand and machine sewing and dress-making. The fundamental stitches are applied to simple articles and to the repairing of garments. Practice is given in the use of the sewing machine, in the drafting of simple patterns by the straight-line systems, and in adapting of commercial patterns. Suitable materials and trimmings are discussed, and a set of undergarments, a shirt waist, a cloth dress, a lingerie dress and a silk waist are made. Notebook work is required.

3. HYGIENE. Both semesters. Class work, two hours.

This course takes up the study of elementary hygiene as applied to the individual, the house and the community, with the idea that the preven-

tion of disease is the most important duty of the home nurse. It includes also the giving of intelligent assistance to the physician and contributing to the comfort of the sick. This involves also the ability to recognize and report symptoms correctly, to give baths, to change bedding, to disinfect, and to render first aid in common emergencies in the home.

4. DESIGN IN THE HOME AND IN CLOTHING. Both semesters. Laboratory, six hours.

This is a course in simple designing and in studying color relations with special reference to problems in the home.

5. FLORICULTURE. Both semesters. Class work, two hours.

Lectures in the classroom are supplemented by practical exercises in the greenhouse, dealing with the propagation and culture of flowers. Soil requirements, the planting of seeds, transplanting, cultivation, the making of cuttings, the selection of varieties adapted to the purposes of window gardening, lawn planting and cutting are discussed in the lectures. An opportunity to become acquainted with the species recommended and with the operations necessary for their successful culture is afforded in the laboratory practice.

6. HOUSEWIFERY. Both semesters. Laboratory, three hours.

This course includes a study of processes and methods in housekeeping.

One-year Course in Lunch-room Management

It is the purpose of this course to offer training to mature women, who are fitted by education and ability to carry on some form of lunch-room management. The positions open to such women will be *commercial* ones only, as the department reserves the right to recommend only the members of the College institutional classes for positions in educational institutions and hospitals.

The positions open to women who complete this one-year course will be in cafeterias, tea rooms, and other commercial establishments which serve food.

This course covers one year, and certificates will be granted on the successful completion of the work.

REQUIREMENTS FOR ADMISSION

The course is open to women twenty-five years of age or older. Applications for entrance must be made in writing and applicants will be chosen by the faculty of the department according to training and ability. The number in the class is limited to twenty, in order to give each member the personal training necessary. At the close of the first semester those who possess qualifications peculiarly adapted for the work of lunch-room management will be selected to continue the course.

HOW TO APPLY FOR ENTRANCE

A student desiring admission to this course is asked to write a letter, giving her general qualifications and training. The Department of Domestic Science will then send a blank to be filled out and returned. After consideration by the faculty of the department, the candidates for this course will be chosen and notified before July 15, 1917.

Each student enrolling in this course is required to furnish herself with three gingham dresses and six white aprons. (Samples of goods and patterns may be obtained from the department.) Students are required to wear this uniform, as personal neatness counts for much in this work.

LUNCH-ROOM MANAGER'S COURSE

Principles of Cookery 4 (0-12)	Institutional Cookery 5 (1-12)
Food Production and Marketing 3 (3-0)	Accounting 2 (0-2)
Business English LR 3 (3-0)	Lunch-room Management 2 (2-0)
Cafeteria Practice LR-I 2 (0-6)	Cafeteria Practice LR-II or Tea-room Service 4 (0-12)
Sanitation and Hygiene 1 (1-0)	Lunch-room Promotion 1, for half semester
Furnishing and Decorating 1 (0-3)	Meal Planning 1, for half semester

1. PRINCIPLES OF COOKERY. First semester. Laboratory, twelve hours.

The purpose of this course is to teach the principles of cookery by means of the preparation of different foods. This course includes both plain and fancy cookery. In the laboratory a standard system of measurement is taught, and special attention is given to training in accuracy, neatness and economy in handling utensils and materials. Standard servings and the cost of prepared foods are carefully estimated.

2. FOOD PRODUCTION AND MARKETING. First semester. Class work, three hours. This course covers the main points in source, production and manufacture of foods. Special stress is laid on marketing and buying for the lunch room. Food values are emphasized.

3. SANITATION AND HYGIENE. First semester. Class work, one hour. This course covers the sanitary control of eating-houses and food supply, together with the personal hygiene of the worker.

4 and 5. CAFETERIA PRACTICE LR-I, LR-II. First and second semesters, respectively. Laboratory, six and twelve hours, respectively.

This course is planned that the student may become thoroughly familiar with the cafeteria. Experience is had in serving, checking and other details.

6. BUSINESS ENGLISH LR. First semester. Class work and practice, three hours.

This course is designed to meet the needs of those who are especially preparing themselves to manage lunch rooms. Essential forms of business correspondence, contract forms, the best forms of making and displaying notices and posters, the best current literature in home economics, and well-directed cultural reading are given their proper emphasis in the course.

7. FURNISHING AND DECORATING. First semester. Laboratory, three hours.

Color, form and arrangement as applied to wall and floor coverings, furniture, linen, china and silver are studied.

8. INSTITUTIONAL COOKERY. Second semester. Class work, one hour; laboratory, twelve hours.

This course applies the principles of cookery to the preparation of large quantities of food for use in the cafeteria. The course is given in the kitchen laboratory of the cafeteria.

9. ACCOUNTING. Second semester. Class work, two hours.

This is a course in the elements of bookkeeping and of business practice as applied to the accounts of lunch rooms, tea rooms, and cafeterias.

10. TEA-ROOM SERVICE. Second semester. Laboratory, twelve hours.

During the second semester the students carry on a tea room in the dining room of the department. So far as it is practicable, students are given an opportunity to do catering. Careful attention is given to service and cost of maintenance.

11. LUNCH-ROOM MANAGEMENT. Second semester. Class work, two hours.

The course covers the field of organization, equipment, service and general management of lunch rooms.

12. MEAL PLANNING. Second semester. Class work, one hour for half the semester.

The planning of meals according to dietary standards is taught in this course. Practice is given in planning menus for cafeterias and tea rooms.

13. LUNCH-ROOM PROMOTION. Second semester. Class work, one hour for half the semester.

The purpose of the course is to show the practical application of the principles of advertising and publicity to the enterprises treated in the course in lunch-room management. The several kinds of advertising are taken up in their relation to the line of business which the students plan to enter. The principles of typographical design as adapted to menu cards and other necessary printed material receive careful attention.

Home Economics in the Summer School

In addition to instruction in various branches of home economics available to teachers during the regular College year, the College offers several courses in this subject in the Summer School. Instruction in these courses is intended to present correctly that which may be introduced successfully into graded schools and high schools. Students will be enrolled upon presentation of a teacher's certificate, or of a certified statement showing that two years' high-school work or its equivalent has been completed.

A special circular giving in detail the courses offered in the Summer School may be had by applying to the President of the College. See, also, the article on Summer School in this catalogue.

Division of General Science

JULIUS TERRASS WILLARD, *Dean*

In the class of colleges to which this institution belongs, the classical studies of the older type of college are replaced by work in the sciences and in vocational subjects. A sound basis for technical training includes thorough training in mathematics, physical science, and biological science. It is believed also that education should include some preparation for the discharge of one's duties to the State and to the community in which he lives. It should afford him that discipline and culture which alone can give him a grasp of the relations among things, a breadth of view, a tolerant attitude, and hence an influence over his associates and fellow citizens of every station in life.

It is the province of the departments grouped in this division of the College to give this basic, scientific, cultural, and disciplinary training. Their work is not only foundational, but it penetrates through all the characteristic vocational courses of the institution, as the structural steel of the modern skyscraper penetrates the entire building and forms a secure framework and support for the parts more readily visible. These departments thus give unity to all of the four-year courses of study, although presenting but two courses that are distinctive of their own work. These, however, by means of electives and options, are susceptible of manifold modification and application.

CURRICULUM IN GENERAL SCIENCE

The curriculum in general science includes fundamental training in English, mathematics, science, history, economics, military science, and physical training required in the several specialized vocational courses now offered by the College and chosen by the great body of our students. Its required subjects constitute the central educational basis of the institution. By means of a number of groups of electives, it gives an opportunity to students to advance themselves still further in these fundamental lines and to give special attention to some instead of taking the vocational subjects characterizing other courses. This opportunity meets the needs of several types of young people, among whom are: (1) Those who have not yet fully decided as to their vocation, but who wish an education that is strong and well balanced in respect to modern science and cultural subjects, as a foundation for further education or as a preparation for sound citizenship and intellectual satisfaction in life. (2) Those who are looking forward to teaching in the high schools of the State. The electives offered allow one to give special attention to mathematics, physical science, biological science, agriculture, domestic science and art, history, economics, English, and professional educational subjects. (3) Those who are fitting themselves for research work in the sciences, especially as applied to agriculture, engineering, and other industries.

The elective groups offered in this curriculum are to a considerable extent made up of studies required in one or more of the specialized curriculums. They provide also, however, advanced work not included in other curriculums. The scientific work in connection with the Agricultural and Engineering Experiment Stations, and several fields of State investigation and service, calls for the operation of unusually well-equipped departments in the sciences, and excellent facilities for practical training in this work are thus afforded.

While the curriculum in general sciences offers a wide choice of electives, these may not be selected aimlessly, or with the idea of choosing the easiest, or of obtaining credit for miscellaneous subjects taken elsewhere or in other curricula. The studies of the freshman and sophomore years are basic and are required of all, without exception. They insure a broad and adequate foundation for subsequent work in the several lines of electives. The electives are to be chosen in groups, approved by the faculty or by the Dean of the Division of General Science, and in such a manner as to give logical coherence to the curriculum as a whole. The elective portion of the curriculum, as thus made up, will consist for the most part of several groups of three or more full studies or their equivalent. It is possible to include some single subjects that may be advantageously taken without others. Special combinations in sewing, cooking, and shop work have been planned to meet the needs of prospective teachers of manual training. Students changing from other curricula to that in general science receive credit for work done in the other curricula in so far as it may be fitted into the general plan of this one.

The curriculum in general science is thus many in one. Such various combinations of groups are possible that it is not practicable to print all of them in extended form. There are, therefore, formally presented herewith the required subjects of the curriculum in their specified order by years and terms, together with a considerable number of groups of electives.

Finally, combinations of these groups that have been approved are indicated by means of numbers assigned to the several groups. Other combinations may be arranged.

CURRICULUM IN INDUSTRIAL JOURNALISM.

Knowledge is power only as it comes into the possession of those who can use it; it gives pleasure in direct proportion to the extent of its diffusion. A discovery is of but little value as long as the discoverer is the only one who knows of its existence, and the printed page is by far the most effective means of extending knowledge concerning it. Magazines and newspapers never sleep, nor do they take vacations, and their power to elevate mankind is incalculable. But printed knowledge becomes effective only as it is read, and to be widely read in this day it must stand out from the great mass of other matter and gain the attention and hold the interest of the reader. To do this its points must be sharp and easily seen, and the style must be attractive. On the other

hand, if the presentation is not essentially true, the more attractive it is the worse it is and the greater the harm that follows wide reading of it.

The curriculum in industrial journalism endeavors to give young men and women training which will enable them to write both truthfully and effectively, particularly upon industrial subjects. To such subjects the modern newspaper and the general magazine are giving constantly more attention, while there are also 500 agricultural publications and a greater number of class and trade publications which are largely or exclusively concerned with matters relating to industrial life. The training given by the College has enabled a goodly number of alumni to do successful work upon these publications.

The aim of the curriculum is to present such subjects as will enable the writer to see his work in proper perspective, to obtain authoritative knowledge of some field of industrial activity, and to write acceptably. The curriculum consequently offers in the first place fundamental studies of literary, social and scientific character. Because of the materials with which journalism deals, it is highly desirable that the student obtain a clear knowledge of the social sciences and be able to read at least one current foreign language. Every student in the course is strongly urged to elect German or French. In the second place, the student is required to elect subjects in agriculture, mechanic arts, applied science, or home economics, depending on what portion of the field of industrial journalism he desires to enter, it being expected that every student graduated from the curriculum shall have special knowledge of some prominent line of industry. In the third place, the theory and practice of journalism are presented in a series of courses extending throughout the sophomore, junior, and senior years, and opportunity is offered for taking additional electives in journalism simultaneously with the required courses.

The College thus affords preparation for work in a wide and inviting field. Our unprecedented industrial achievements have been made by the application of discoveries in physical and biological science. Much of discovery and much of application are yet to come, and one who can write truthfully and attractively of that which is, and of that which comes, will find ample reward.

Curriculum in General Science

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
Chemistry I Chem. 101 5(3-4, 2)	Chemistry II Chem. 102 5(3-4, 2)
Plane Trigonometry Math. 101 3(3-0)	College Algebra Math. 104 3(3-0)
General Botany Bot. 101 3(1-6)	Plant Physiology I Bot. 104 3(1-6)
Current History Hist. 126 1(1-0)	Current History Hist. 126 1(1-0)
Library Methods Lib. Ec. 101 1(1-0)	Elective 2(-)
Military Science I (Men) Mil. Tr. 101..... 1(0-3) or	Military Science II (Men) Mil. Tr. 102..... 1(0-3) or
Physical Training W-I (Women) Phys. Ed. 151 1(0-3)	Physical Training W-II (Women) Phys. Ed. 152..... 1(0-3)
Hygiene and Social Problems M or W Phys. Ed. 125 or	
Home Ec. 145 R	

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
English Literature I Engl. 171 4(4-0)	English Literature II Engl. 174 4(4-0)
English History Hist. 121 3(3-0)	Modern Europe Hist. 223 3(3-0)
General Physics I Physics 201 4(3-3)	General Physics II Physics 202 4(3-3)
General Zoölogy I Zoöl. 101 3(2-3)	General Zoölogy II Zoöl. 102 3(2-3)
Elective 3(-)	Elective 3(-)
Military Science III (Men) Mil. Tr. 103..... 1(0-3) or	Military Science IV (Men) Mil. Tr. 104..... 1(0-3) or
Physical Training W-III (Women) Phy. Ed. 153 1(0-3)	Physical Training W-IV (Women) Phys. Ed. 154 1(0-3)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
American Government Hist. 151 3(3-0)	American History I Hist. 101 (3-0)
Psychology Edu. 101 3(3-0)	Economics Econ. 101 3(3-0)
Extempore Speech I Pub. Sp. 201 2(2-0)	General Microbiology Bact. 101 3(1-6)
Elective * 3(-)	Elective * 6(-)

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Elective † 16(-)	Elective † 16(-)

* Students who offer but one unit of algebra for admission take a five-credit course in College Algebra, Math. 107. The additional credits are applied against electives.

† Electives are to be chosen, with the advice and approval of the Dean, in groups of not less than eight semester credits, or in courses which extend fields already entered in the required work.

ADAPTATION CURRICULA FOR CLASSES OF 1918, 1919 and 1920

On account of the change from the three-term to the semester calendar and the changes in the content of the curriculum in general science, the classes that had already entered upon the old curriculum will satisfy the requirements for graduation by completing curricula as follows:

Class of 1918.—Freshman, sophomore and junior years as published in the catalogue for 1913-'14; senior year, American History I, 3 hours, and electives, 29 hours.

Class of 1919.—Freshman and sophomore years as published in the catalogue for 1914-'15; junior and senior years in accordance with the new curriculum, except that two hours of electives will replace Extempore Speech I.

Class of 1920.—Freshman year of course in general science as published in the catalogue for 1915-'16; sophomore, junior and senior years as shown in this catalogue, excepting that in the sophomore year English Literature I, English Literature II, and three hours of elective are replaced by College Rhetoric II (3 hours), English Literature (5 hours), and qualitative analysis (3 hours).

Groups of Electives and Options for Students in the Division of General Science

In addition to the courses included in the following groups, others will be found described in the exposition of the work of the respective departments.

From any group elected a sufficient number of courses to constitute an effective block of knowledge must be taken. At least eight semester credits in any new field are usually required, but a smaller number will be honored if in a field already entered upon.

1

FIRST SEMESTER		SECOND SEMESTER	
Advanced Composition I		Advanced Composition II	
Engl. 113	2(2-0)	Engl. 116	2(2-0)
Business English		Advertising English	
Engl. 122	3(3-0)	Engl. 125	3(3-0)
Oral English I		Oral English II	
Eng. 128	3(3-0)	Engl. 131	3(3-0)
Composition and Literature I		Composition and Literature II	
Engl. 151	2(2-0)	Engl. 154	2(2-0)
Argumentation and Debate		Methods of Teaching English	
Engl. 119	3(3-0)	Engl. 134	3(3-0)
The Short Story		Community English	
Engl. 251	3(3-0)	Engl. 254	2(2-0)

2

The English Bible		The Shakespearian Drama	
Engl. 271	3 (3-0)	Engl. 274	3 (3-0)
Nineteenth Century Literature		American Literature	
Engl. 277	3 (3-0)	Engl. 280	3 (3-0)
Current Literature		The Novel	
Engl. 282	2 (2-0)	Engl. 285	2 (2-0)
English Survey I		English Survey II	
Engl. 288	2 (2-0)	Engl. 290	2 (2-0)
Tennyson and Browning		The Arts and Crafts Movement	
Engl. 293	3 (3-0)	Engl. 295	2 (2-0)

3

German I		German II	
Mod. Lang. 101	3(3-0)	Mod. Lang. 106.....	3(3-0)
German Readings		German Short Stories	
Mod. Lang. 111	3(3-0)	Mod. Lang. 201.....	3(3-0)
Scientific German I		Scientific German II	
Mod. Lan. 236	3(3-0)	Mod. Lang. 241	3(3-0)

4

French I		French II	
Mod. Lang. 151	3(3-0)	Mod. Lang. 156	3(3-0)
French Readings		French Short Stories	
Mod. Lang. 161	3(3-0)	Mod. Lang. 251	3(3-0)

ELECTIVES—COURSE IN GENERAL SCIENCE—*continued*

FIRST SEMESTER

Plane Analytical Geometry	
Math. 110	4(4-0)
Calculus I	
Math. 113	5(5-0)
Analysis of Statistics	
Math. 125	3(3-0)
Differential Equations	
Math. 201	3(3-0)

Advanced Inorganic Chemistry	
Chem. 201	5(5-0)
Inorganic Preparations	
Chem. 202 ...	2(0-6) to 4(0-12)
Industrial Chemistry I	
Chem. 203	5(3-6)

Organic Chemistry I	
Chem. 220	5(3-6)

Quantitative Analysis I	
Chem. 150	2(0-6)
Quantitative Analysis II	
Chem. 250	3(1-6)
Qualitative Analysis	
Chem. 240	3(1-6)

Household Physics	
Physics 101	4(4-0)
Photography	
Physics 120	2(1-3)
Molecular Physics	
Physics 221	4(3-3)
Wireless Telegraphy	
Physics 130	2(1-3)

Agricultural Microbiology	
Bact. 106	3(1-6)
Hygienic Bacteriology	
Bact. 206	4(2-6)
Pathogenic Bacteriology II	
Bact. 116	4(2-6)
Poultry Bacteriology	
Bact. 213	3(1-6)

Plant Pathology I	
Bot. 107	3(1-6)
Plant Pathology II	
Bot. 201	1(0-3)
Plant Genetics I	
Bot. 211	3(1-6)
Economic Botany	
Bot. 219	3(1-6)
Evolution of Plants	
Bot. 222	3(3-0)

5

SECOND SEMESTER

Teachers' Course in Mathematics	
Math. 122	3(3-0)
Calculus II	
Math. 116	3(3-0)
Mathematics of Biology	
Math. 128	3(3-0)
Institutional Accounting	
Math. 131	3(3-0)
Accounting Practice	
Math. 134	3(3-0)

6

Industrial Electro-Chemistry	
Chem. 205	2(2-0)
Physical Chemistry	
Chem. 206	5(3-6)
Industrial Chemistry II	
Chem. 204	5(3-6)

7

Organic Chemistry II	
Chem. 221	5(3-6)
Physiological Chemistry	
Chem. 231	5(3-6)

8

Quantitative Analysis I	
Chem. 150	2(0-6)
Quantitative Analysis III	
Chem. 251	3(1-6)
Household Chemistry	
Chem. 265	3(1-6)

9

Agricultural Physics	
Physics 111	3(3-0)
Harmonics	
Physics 222	2(2-0)
Physical Measurements	
Physics 223	3(2-3)
Special Methods in Teaching	
Physics	
Physics 224	3(2-3)

10

Soil Microbiology	
Bact. 201	3(1-6)
Pathogenic Bacteriology I	
Bact. 111	4(2-6)
Dairy Bacteriology	
Bact. 211	3(1-6)
Water Purification and Sewage	
Disposal	
Bact. 221	3(1-6)

11

Plant Physiology II	
Bot. 203	3(3-0)
Plant Breeding	
Bot. 205	3(1-6)
Plant Histology	
Bot. 215	2(0-6)
Seed Testing	
Bot. 116	1(0-3)
Taxonomic Botany	
Bot. 225	3(1-6)

ELECTIVES—COURSE IN GENERAL SCIENCE—*continued*

FIRST SEMESTER		12	SECOND SEMESTER	
Advanced Invertebrate Zoölogy			Advanced Vertebrate Zoölogy	
Zoöl. 201	4(2-6)		Zoöl. 202	4(2-6)
Taxonomy of Invertebrates			Taxonomy of Vertebrates	
Zoöl. 205	3(0-9)		Zoöl. 208	3(0-9)
Cytology			Animal Ecology	
Zoöl. 214	3 or 4(2-3 or 6)		Zoöl. 211	3(1-6)
Parasitology			Economic Zoölogy	
Zoöl. 123	2(1-3)		Zoöl. 126	3(1-6)
Dynamic and Structural Geology		13	Historical Geology	
Geol. 101	2(2-0)		Geol. 201	2(2-0)
General Entomology			Engineering Geology	
Ent. 101	3(2-3)		Geol. 102	4(2-6)
Insect Morphology I		14	General Economic Entomology	
Ent. 211	3(1-6)		Ent. 206	3(2-3)
Advanced General Entomology			Principles of Taxonomy	
Ent. 221	3(3-0)		Ent. 216	1(1-0)
American History II			Taxonomy of Insects I	
Hist. 202	3(3-0)		Ent. 207	2(0-6)
American Industrial History			Apiculture	
Hist. 105	3(3-0)	15	Ent. 111	3(2-3)
Pan America			American History III	
Hist. 207	2(2-0)		Hist. 203	3(3-0)
French History			European Industrial History	
Hist. 122	3(3-0)		Hist. 224	3(3-0)
The Ancient World			American Political History	
Hist. 229	3(3-0)		Hist. 206	2(2-0)
Immigration and International Relations.			Comparative Government	
Hist. 228	2(2-0)		Hist. 252	2(2-0)
Business Law I		16	Kansas History	
Hist. 153	1(1-0)		Hist. 230	2(2-0)
Farm Law			History of the Home	
Hist. 155	2(2-0)		Hist. 225	3(3-0)
Economics		17	Business Law II	
Econ. 101	3(3-0)		Hist. 154	1(1-0)
Principles of Sociology			International Law	
Econ. 201	3(3-0)		Hist. 256	2(2-0)
Business Organization			Agricultural Economics	
Econ. 204	1(1-0)		Econ. 102	3(3-0)
Labor Problems			Marketing and Coöperation	
Econ. 207	1(1-0)		Econ. 216	2(2-0)
Educational Administration		18	Money and Banking	
Educ. 105	3(3-0)		Econ. 210	1(1-0)
History of Education			Public Finance	
Educ. 113	3(3-0)		Econ. 213	1(1-0)
Rural Education			Educational Psychology	
Educ. 201	3(3-0)		Educ. 109	3(3-0)
			Educational Sociology	
			Educ. 117	2(2-0)

ELECTIVES—COURSE IN GENERAL SCIENCE—*continued*

19	
FIRST SEMESTER	SECOND SEMESTER
Agricultural Education	Special Methods in the Teaching of Agriculture
Educ. 125 2(2-0)	Educ. 135 2(2-0)
	Supervised Observation and Teaching in Agriculture
	Educ. 145 2(0-6)
Home Economics Education	Special Methods in the Teaching of Home Economics
Educ. 121 2(2-0)	Educ. 131 2(2-0)
	Supervised Observation and Teaching in Home Economics
	Educ. 141 2(0-6)
Industrial Education	Special Methods in the Teaching of Subjects in Industrial Arts
Educ. 129 2(2-0)	Educ. 139 2(2-0)
	Supervised Observation and Teaching in Industrial Arts
	Educ. 149 2(0-6)
20	
Elementary Journalism	Industrial Writing
Ind. Jour. 107 2(2-0)	Ind. Jour. 113 2(2-0)
Journalism Practice I	Journalism Practice II
Ind. Jour. 110 2(0-6)	Ind. Jour. 116 2(0-6)
Industrial Feature Writing	Technical Journalism
Ind. Jour. 123 2(2-0)	Ind. Jour. 130 2(2-0)
Journalism Practice III	Journalism Practice IV
Ind. Jour. 127 2(0-6)	Ind. Jour. 133 2(0-6)
21	
Materials of Journalism	Magazine Features
Ind. Jour. 213 2(2-0)	Ind. Jour. 216 2(2-0)
History of Journalism	Journalism Surveys
Ind. Jour. 219 2(2-0)	Ind. Jour. 222 2(0-6)
23	
Voice.	
Two private lessons per week. Two semester credits.	
Piano.	
Two private lessons per week. Two semester credits.	
Violin.	
Two private lessons per week. Two semester credits.	
Wind Instruments.	
Two private lessons per week. Two semester credits.	
Harmony I	Harmony II
Music 101 2(2-0)	Music 102 2(2-0)
Harmony III	Harmony IV
Music 103 2(2-0)	Music 104 2(2-0)
Counterpoint	Musical Form and Analysis
Music 107 2(2-0)	Music 109 2(2-0)
Musical History I	Musical History II
Music 110 1(1-0)	Music 111 1(1-0)
School Music Methods I	School Music Methods II
Music 120 2(2-0)	Music 121 2(2-0)
School Music Methods III	School Music Methods IV
Music 122 2(2-0)	Music 123 2(2-0)
Choral Society	Choral Society
Music 150 1(1-0)	Music 150 1(1-0)
Orchestra	Orchestra
Music 151 1(-)	Music 151 1(-)
Military Band	Military Band
Music 152 1(-)	Music 152 1(-)

ELECTIVES—COURSE IN GENERAL SCIENCE—*continued*

30

FIRST SEMESTER

American History I	
Hist. 101	3 (3-0)
American Government	
Hist. 151	3 (3-0)
English History	
Hist. 121	3 (3-0)
Economics	
Econ. 101	3 (3-0)
Business Organization	
Econ. 204	1 (1-0)
Labor Problems	
Econ. 207	1 (1-0)
Principles of Sociology	
Econ. 201	3 (3-0)

General Botany	
Bot. 101	3 (1-6)
Plant Pathology I	
Bot. 107	3 (1-6)
Economic Botany	
Bot. 219	3 (1-6)
Farm Forestry	
Hort. 113	3 (3-0)
Gardening	
Hort. 213	3 (3-0)
General Zoölogy I	
Zoöl. 101	3 (2-3)
Parasitology	
Zoöl. 123	2 (1-3)
Embryology and Physiology	
Zoöl. 108	5 (3-6)
Hygienic Bacteriology	
Bact. 206	4 (2-6)
General Entomology	
Ent. 101	3 (2-3)
Horticultural Entomology	
Ent. 201	2 (2-0)
Organic Chemistry	
Chem. 120	3 (2-2, 1)
Chemistry of Silos and Fertilizers	
Chem. 252	3 (1-6)
Chemistry of Plant Products.	
Chem. 253	3 (1-6)
Human Nutrition	
Chem. 130	3 (3-0)
Household Physics	
Physics 101	4 (4-0)
Photography	
Physics 120	2 (1-3)

Household Physics	
Physics 101	4 (4-0)
Organic Chemistry HE	
Chem. 121	5 (3-4, 2)
Foods II	
Dom. Sci. 102	5 (3-6)

SECOND SEMESTER

American History II or III	
Hist. 202, 203	3 (3-0)
Pan America	
Hist. 207	2 (2-0)
Modern Europe	
Hist. 223	3 (3-0)
Agricultural Economics	
Econ. 102	3 (3-0)
Money and Banking	
Econ. 210	1 (1-0)
Public Finance	
Econ. 213	1 (1-0)
Marketing and Coöperation.	
Econ. 216	2 (2-0)
Agricultural Land Problems	
Econ. 219	1 (1-0)

31

Plant Physiology I	
Bot. 104	3 (1-6)
Plant Breeding	
Bot. 205	3 (1-6)
Seed Testing	
Bot. 116	1 (0-3)
Plant Propagation	
Hort. 101	3 (2-2, 1)
Landscape Gardening I	
Hort. 216	4 (2-6)
General Zoölogy II	
Zoöl. 102	3 (2-3)
Economic Zoölogy	
Zoöl. 126	3 (1-6)
General Microbiology	
Bact. 101	3 (1-6)
Water Purification and Sewage Disposal	
Bact. 221	3 (1-6)
General Economic Entomology	
Ent. 206	3 (2-3)
Apiculture	
Ent. 111	3 (2-3)
Quantitative Analysis I	
Chem. 150	2 (0-6)
Chemistry of Dairy Products	
Chem. 254	3 (1-6)
Chemistry of Meats	
Chem. 255	3 (1-6)
Household Chemistry	
Chem. 265	3 (1-6)
Agricultural Physics	
Physics 111	3 (3-0)
Wireless Telegraphy	
Physics 130	2 (1-3)

32

Foods I	
Dom. Sci. 101	3 (1-6)
Household Microbiology	
Bact. 121	5 (3-6)
Dietetics	
Dom. Sci. 201	5 (3-6)

ELECTIVES—COURSE IN GENERAL SCIENCE—*continued*

33

FIRST SEMESTER

Design	
Home Art 101	3(0-9)
Clothing II	
Dom. Art. 103	3(1-6)
Home Decoration	
Home Art 201	3(0-9)

SECOND SEMESTER

Clothing I	
Dom. Art 101	2(0-6)
Costume Design	
Dom. Art 102	3(1-6)
Textiles	
Dom. Art 104	3(2-3)
Art Appreciation	
Home Art 202	3(3-0)

35

General Botany	
Bot. 101	3(1-6)
Types and Classes of Live Stock	
An. Husb. 101	3(1-6)
Grain Crop Production	
Agron. 101	3(2-2, 1)
Elements of Dairying	
Dairy Husb. 101	3(2-3)
Organic Chemistry	
Chem. 120	3(2-2, 1)
Plant Pathology I	
Bot. 107	3(1-4, 2)
Soils	
Agron. 131	4(3-3)
Quantitative Analysis I	
Chem. 150	2(0-6)

Plant Physiology I	
Bot. 104	3(1-6)
Plant Propagation	
Hort. 101	3(2-2, 1)
Forage Crop Production	
Agron. 102	3(2-2, 1)
Dairy Judging	
Dairy Husb. 104	1(0-3)
Farm Poultry Production	
Poult. Husb. 101	2(1-2, 1)
Principles of Feeding	
An. Husb. 104	3(3-0)
Orcharding	
Hort. 107	2(1-2, 1)
Soil Fertility	
Agron. 132	3(2-2, 1)

36

General Drawing	
Arch. 101	1(0-3)
Ink Rendering	
Arch. 155	1(0-3)
Residences	
Arch. 119	3(3-0)
Rural Architecture	
Arch. 194, 195	3(1-6)

Linear Perspective	
Arch. 134	1(0-3)
Color Rendering	
Arch. 153	1(0-3)
Architectural Drawing I	
Arch. 110	2(0-6)
Home Architecture	
Arch. 197, 198	3(1-6)

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Wood Working for Grammar Grades	
Shop 120	2(0-6)
Wood Working II for High Schools	
Shop 130	2(0-6)
Forging I	
Shop 150	1(0-3)
Forging III	
Shop 215	1(0-3)
Foundry Practice	
Shop 160	1(0-3)
Metallurgy	
Shop. 165	2(2-0)
Machine Tool Work II	
Shop 225	2(0-6)
Farm Motors I	
Steam and Gas 140, 145..	3(2-3)
Concrete Construction	
Ap. Mech. 140, 145.....	2(1-3)
Surveying I	
C. E. 101, 105	2(1-3)

Wood Working I for High Schools	
Shop 125	2(0-6)
Wood Turning	
Shop 135	2(0-6)
Forging II	
Shop 155	1(0-3)
Forging IV	
Shop 220	1(0-3)
Pattern Making	
Shop 145	1(0-3)
Machine Tool Work I	
Shop 170	2(0-6)
Machine Tool Work III	
Shop 230	1(0-3)
Farm Motors II	
Steam and Gas 150, 155..	3(2-3)
Mechanical Drawing I	
Ap. Mech. 160, 165.....	2(1-3)
Farm Sanitation and Water Supply	
C. E. 140	2(2-0)

ELECTIVES—COURSES IN GENERAL SCIENCE—*continued*

45

FIRST SEMESTER		SECOND SEMESTER	
Organic Chemistry		Quantitative Analysis I	
Chem. 120	3(2-2, 1)	Chem. 150	2(0-6)
Grain Crop Production		Principles of Milling	
Agr. 101	3(2-2, 1)	Mill. Ind. 101.....	1(0-3)
Grain Marketing		Milling Practice I	
Mill. Ind. 102.....	3(3-0)	Mill. Ind. 201.....	3(1-6)
Wheat and Flour Testing		Grain Products	
Mill. Ind. 203.....	4(1-9)	Mill. Ind. 103.....	2(2-0)
		Experimental Baking	
		Mill. Ind. 204.....	2(0-6)
		Milling Practice II	
		Mill. Ind. 202	2(0-6)

Curriculum in Industrial Journalism

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER		SECOND SEMESTER	
College Rhetoric I		College Rhetoric II	
Engl. 101	3(3-0)	Engl. 104	3(3-0)
Chemistry I		Chemistry II	
Chem. 101	5(3-4, 2)	Chem. 102	5(3-4, 2)
Principles of Typography I		Principles of Typography II	
Ind. Jour. 101.....	3(2-3)	Ind. Jour. 104.....	3(2-3)
Library Methods		Current History	
Lib. Ec. 101.....	1(1-0)	Hist. 126	1(1-0)
Current History			
Hist. 126	1(1-0)	Options	5(-)
Options	3(-)	Industrial Journalism Lecture....	R
Industrial Journalism Lecture....	R	Military Science II (Men)	
Military Science I (Men)		Mil. Tr. 102.....	R or
Mil. Tr. 101.....	1(0-3) or	Physical Training W-II (Women)	
Physical Training W-I (Women)		Phys. Ed. 152.....	R
Phys. Ed. 151	1(0-3)		
Hygiene and Social Problems M or W			
Phys. Ed. 125 or			
Home Ec. 145	R		

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
English Literature I Engl. 171 4(4-0)	English Literature II Engl. 174 4(4-0)
General Zoölogy I Zoöl. 101 3(2-3) or	General Zoölogy II Zoöl. 102 3(2-3) if <i>General Zoölogy I is chosen the first semester.</i>
General Botany Bot. 101 3(1-6)	Plant Physiology I Bot. 104 3(1-6) or
	General Microbiology Bact. 101 3(1-6) if <i>General Botany is chosen the first semester.</i>
Elementary Journalism Ind. Jour. 107 2(2-0)	Industrial Writing Ind. Jour. 113 2(2-0)
Journalism Practice I Ind. Jour. 110 2(0-6)	Journalism Practice II Ind. Jour. 116 2(0-6)
Options * 6(-)	Options * 6(-)
Ind. Jour. Lecture R	Ind. Jour. Lecture R
Military Science III (Men) Mil. Tr. 103 1(0-3) or	Military Science (Men) Mil. Tr. 104 1(0-3) or
Physical Training W-III (Women) Phy. Educ. 153 1(0-3)	Physical Training W-IV (Women) Phy. Educ. 154 1(0-3)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Industrial Feature Writing Ind. Jour. 123 2(2-0)	Technical Journalism Ind. Jour. 130 2(2-0)
Journalism Practice III Ind. Jour. 127 2(0-6)	Journalism Practice IV Ind. Jour. 133 2(0-6)
Extempore Speech I Pub. Sp. 201 2(2-0)	Principles of Advertising Ind. Jour. 125 3(3-0)
Options and Electives * 10(-)	Options and Electives * 9(-)
Ind. Jour. Lecture R	Ind. Jour. Lecture R

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Circulation and Advertising Promotion Ind. Jour. 201 3(3-0)	Editorial Practice Ind. Jour. 207 2(2-0)
Copy Reading Ind. Jour. 204 2(0-6)	Ethics of Journalism Ind. Jour. 210 2(2-0)
Electives and Options * 11(-)	Electives and Options * 11(-)
Ind. Jour. Lecture R	Ind. Jour. Lecture R

ADAPTATION CURRICULA FOR CLASSES OF 1918, 1919, and 1920

As the work already completed by the classes of 1918, 1919 and 1920 in the former curriculum in industrial journalism is somewhat different from that required by the present one, some modifications of the latter are necessary in order to adapt it to the existing conditions. Students will follow the new curriculum excepting as provided in the following paragraphs:

The class of 1918 will take Journalism Practice III and Journalism Practice IV instead of Copy Reading and two of the elective credits.

The class of 1919 will in the junior year take Elementary Journalism, Industrial Writing, Journalism Practice I and Journalism Practice II and two elective credits instead of Industrial Feature Writing, Technical Journalism, Journalism Practice III, Journalism Practice IV and Extempore Speech I. In the senior year Journalism Practice III and Journalism Practice IV will replace four elective credits.

The class of 1920 will take, in the sophomore year, College Rhetoric II (three semester credits) and English Literature (five semester credits) instead of English Literature I, and English Literature II. In the junior year they will replace Extempore Speech I by two credits on options.

* The options and electives are chosen with the advice and approval of the Dean. The options are in two general groups, of eighteen semester credits each, i. e. (1) social science, and (2) courses related to an industry or applied science. In the tabulated presentation of electives for students in the Division of General Science on preceding pages, groups will be found that will be accepted as the required options and electives. One of the groups 31, 32, 34, 37 or 40 may be chosen as the option in an industry or applied science from which eighteen semester credits are to be chosen. From group 30 eighteen semester credits are to be chosen in satisfaction of the social science option. Electives are to be chosen in groups of usually not fewer than eight semester credits, or in courses which extend fields already entered upon in the required work or the options.

Bacteriology

Professor BUSHNELL
Assistant Professor HUNTER
Instructor JACKLEY

Instructor GAINES
Assistant GLASGOW
Assistant MCCLUNG

The Department of Bacteriology occupies a part of the first and second floor of Veterinary Hall. The space is divided into offices and private laboratories, an experiment station and research laboratory, two large general laboratories, incubator or temperature room, washroom, and stock room. The laboratories are well lighted and equipped with gas, lockers, ice chests, sterilizers, wall cases, microscopes, and other modern facilities necessary for bacteriological work.

The instruction consists of lectures, recitations, demonstrations, and laboratory practice. Printed synopses of lectures and printed laboratory directions are furnished the students in some of the courses; in others textbooks are required. The department library contains textbooks on bacteriology and allied subjects, also the current files of the important technical periodicals relating to bacteriology. These are at the constant disposal of the students for reference. To those who desire graduate work the department offers excellent facilities.

Bacteriology is presented to the students as a biological science and as a practical factor in everyday life. In this subject only the simplest forms of life, consisting almost invariably of one-celled organisms, are studied. It is now possible to study these microscopical forms with ease and accuracy, thus paving the way for a more complete study and better understanding of cells in the aggregate. The second point of view from which this subject is approached is that of its practical application in agriculture, medicine, domestic science, and sanitary engineering.

COURSES IN BACTERIOLOGY

FOR UNDERGRADUATES

101. GENERAL MICROBIOLOGY. Sophomore or junior year, second semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: Chemistry II. Professor Bushnell and Mr. McClung.

This general introductory course consists of lectures, recitations and demonstrations covering the morphological and biological characters, the classification and the distribution of bacteria; factors necessary for the development of bacteria, culture media, cultural features, staining values, and fundamental principles of applied bacteriology.

Laboratory.—The student prepares culture media and becomes familiar with principles of sterilization and incubation, and with general laboratory technique. During the last half of the semester, organisms representing the different families and genera of Migula's classification are studied microscopically and culturally. Also preliminary quantitative and qualitative examinations are made of milk, water, soil, etc.

106. AGRICULTURAL MICROBIOLOGY. Junior year, first semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: Organic Chemistry. Professor Bushnell and Mr. McClung.

This is a general course consisting of lectures, recitations and demonstrations. The relation of microorganisms to agriculture is particularly

emphasized. First, information is given concerning the nature of microorganisms; their biological characteristics, classification and distribution in nature; their influence upon the plant food in the soil; their relation to certain fermentations, etc. Later some emphasis is placed upon the relation of microorganisms to disease; sources and modes of infection; use of germicidal agents and general hygienic measures.

Laboratory.—In the laboratory, the student becomes familiar with methods of cultivating and studying bacteria, yeasts and molds. Various known forms are studied; methods for the quantitative and qualitative analysis of water, milk, etc., are given some attention. Some time is given to methods of sterilization and the use of germicidal agents. The aim of this course is to give the student a general working knowledge of the subject and to point out its relation to agriculture and the problems of every day life.

111. PATHOGENIC BACTERIOLOGY I. Sophomore year, second semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisite: Chemistry II. Doctor Jackley.

This is primarily a general introductory course, consisting of lectures, demonstrations and recitations covering the distribution, the morphological and biochemical features of microorganisms; factors necessary for the development and cultivation of bacteria and the fundamental principles of the science as applied to veterinary medicine.

Laboratory.—The student first becomes acquainted with the general laboratory technique, comprising the preparation of media, methods of sterilization, incubation, inoculation, plating, isolating, and staining of bacteria. Different cultures of microorganisms are studied morphologically, culturally and biochemically. A quantitative and qualitative examination of different food substances is made at the latter part of the term.

116. PATHOGENIC BACTERIOLOGY II. Junior year, first semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisite: Pathogenic Bacteriology I. Doctor Jackley.

A study is made of the morphology, powers of resistance, pathogenesis, distribution, channels of infection and means of dissemination of pathogenic bacteria, especially those related to the specific infectious diseases of animals; epizootic and epidemic diseases of unknown etiology are further treated. A detailed study is made of the manufacture, standardization, preparation for the market and use of vaccines, antitoxins and other biological products related to the diagnosis, prevention and treatment of specific infectious diseases; of susceptibility, immunity, and infection; of theories of immunity; of anaphylaxis, opsonins, precipitins, bacteriolysins, and agglutinins.

Laboratory.—A study is made of the microscopical and cultural character of pathogenic microorganisms; of laboratory animal inoculations, autopsy, and diagnosis; prevention and treatment of specific infectious diseases. Experimental production of opsonins, antitoxins, agglutinins, precipitins, and cytolytic substances; experiments showing the constitutions and mode of action of these antibodies; production of active and passive anaphylaxis, and of anaphylatoxin; methods for the production and standardization of biological products, such as diphtheria and tetanus antitoxin, bacterins, etc.; the application of the various phenomena of immunity in the diagnosis of infectious diseases; the identification of animal and vegetable proteins; complement fixation tests for glanders, opsonic technique, etc., comprises the laboratory work.

121. HOUSEHOLD MICROBIOLOGY. Sophomore year, second semester. Lectures, three hours; laboratory, six hours. Five semester credits. Prerequisite: Elementary Organic Chemistry. Professor Bushnell and Miss Glasgow.

This course consists of lectures, recitations and demonstrations relating to the classification, distribution and the relative importance of bacteria. The morphological and biochemical characters of microorganisms are considered, together with a study of those factors necessary for the proper development of bacteria, and the fundamental principles of the science as applied to household economics. It is designed to give the student a more thorough knowledge of those microorganisms which are of importance in the household. The significance of microbial findings in the analysis of water, milk, and foods, also consideration of the conditions which tend to increase or decrease the bacterial content of food substances are studied in detail. Some time is given to the principles of sanitation as applied to public-health problems. The class work is a more theoretical consideration of the problems undertaken in the laboratory.

Laboratory.—General laboratory technique is first taken up, consisting of preparation of media, methods and principles of sterilization incubation, plating, isolating and staining of microorganisms. Studies consisting of the morphological, cultural and biochemical characteristics of different organisms are made. A study of microorganisms and their activities, both beneficial and harmful, in their relation to household economy; bacteriological study of water, milk, and foods; the determination of the potability of water; milk contamination, the effect of cooling upon the bacterial content of milk, pasteurization of milk, etc; microscopical study of yeasts and molds; the spoilage of canned vegetables and fruits; methods of food preservation; the manufacture of vinegar; study of activities of various species of microorganisms, thermal death point, the germicidal action of various disinfectants, etc., are topics taken up in the laboratory work.

140. SANITARY BIOLOGY. Junior year, first semester. Class work, two hours. Two semester credits. Assistant Professor Hunter.

Consideration is given to morphology, classification, distribution and life processes of bacteria. Attention is given, also, to general characters of algæ, fungi and protozoa in their relation to potable water; to the interpretation of the results of quantitative and qualitative bacteriological examinations of water; to the significance of the presence of various bacterial species in drinking water; to water-borne diseases and microorganisms involved; to typhoid-fever epidemics; to the bacteriology of sewage effluents and to methods of water purification and sewage disposal.

FOR GRADUATES AND UNDERGRADUATES

201. SOIL MICROBIOLOGY. Elective, second semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: General Bacteriology. Mr. Gainey.

This is an introductory course covering the principles of soil microbiology as defined at the present time, and fitting the student for independent research on microbial investigations of soil, including the influence of microbial flora, of depth and character of soil, temperature, moisture, chemical reaction, aëration, and other factors; activities of soil microorganisms, ammonification, nitrification, denitrification, symbiotic and nonsymbiotic nitrogen fixation. Various texts are recommended as reference books.

Laboratory.—The laboratory work comprises the preparation of various special culture media and reagents necessary to conduct bacteriological analyses of the soil; qualitative analysis and the laboratory study of ammonification, nitrification, denitrification, symbiotic and nonsymbiotic nitrogen fixation; plot experiments and field work illustrating the influence of various factors upon the bacterial flora, and the inoculation of soil with symbiotic nitrogen-fixing bacteria.

206. **HYGIENIC BACTERIOLOGY.** Elective, first semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisite: General Bacteriology, or Household Microbiology. Professor Bushnell and Miss Glasgow.

Pathogenic bacteria, especially those related to disease of man; channels of infection, and means of dissemination of pathogenic bacteria; epidemics, their cause and control; isolation, disinfection, and quarantine; Prophylaxis against specific infectious diseases and important precautions necessary in the control of communicable diseases are studied. Various books are recommended as textbooks.

Laboratory.—The laboratory work comprises microscopical and cultural study of pathogenic bacteria; technique involved in the diagnosis of *Bacterium tuberculosis* in sputum; the culture of pathogenic anaerobic bacteria; the isolation and identification of pathogenic bacteria from animal tissues, from pus and exudates; bacteriological examination of air, water, milk, sewage; interpretation of results, etc.

211. **DAIRY BACTERIOLOGY.** Elective, second semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: General Bacteriology. Assistant Professor Hunter.

Consideration is given to the bacterial flora of milk, butter, and cheese; to infectious diseases conveyed through dairy products; to bacterial contamination of milk by air, water, utensils, etc.; to normal and abnormal fermentations in milk, their significance and control.

Laboratory.—The preparation of culture media necessary for dairy bacteriological work; milk contamination; quantitative and qualitative bacteriological analyses of milk; the microscopical and cultural characters of the types of microorganisms representing the flora of milk, butter, and cheese; types of milk-fermenting organisms; the examination of cream, wash water, and separator slime; the effect of temperature on the growth of milk bacteria; pasteurization of milk; examination of milk for the presence of *Bacterium tuberculosis*, leucocytes and streptococci are taken up in the laboratory work. Various texts are recommended as reference books.

216. **POULTRY BACTERIOLOGY.** Elective, first semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: General Bacteriology. Doctor Jackley.

Consideration is given to the various microbial diseases of poultry; etiology, sources and modes of infection; prevention and cure; to the microbial content of freshly laid eggs, cold-storage eggs, and egg products, with conditions tending toward increase or decrease of this microbial content.

Laboratory.—Microorganisms pathogenic for poultry; artificial production, diagnosis and control of poultry diseases; microbial content of eggs and egg preparations produced and handled under various conditions, form the subject matter of the laboratory work.

221. **WATER PURIFICATION AND SEWAGE DISPOSAL.** Elective, second semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: General Microbiology, or Household Microbiology. Assistant Professor Hunter.

The course comprises a study of the bacterial content of natural waters; of factors influencing the bacterial flora of water; of bacterial indicators of pollution; of the collection and transportation of water samples; of methods of water purification and sewage disposal; of the application of water sanitation to rural homes and municipalities.

Laboratory. The laboratory work consists of quantitative and qualitative examinations, according to standard methods, of water and sew-

age samples; methods involved in the enumeration and identification of intestinal bacteria in water; laboratory study of conditions influencing the bacterial content and potability of water. Printed laboratory directions are furnished.

FOR GRADUATES

301. RESEARCH BACTERIOLOGY. Elective, both semesters. Credit to be arranged. Prerequisite: The student must have credit in at least two of the outlined courses offered by the department. Professor Bushnell.

Advanced students showing sufficient training, ability and interest in original research may be admitted to this course, upon approval of the head of the department. The student will be under the direct supervision of a faculty member of the department and in consultation with him the subject for investigation will be chosen and outlined.

Botany

Professor ROBERTS
Assistant Professor DAVIS
Assistant Professor MILLER
Instructor MELCHERS
Assistant POOLE

Assistant SCHMIDT
Assistant KIRKBRIDE
Assistant TOOLE
Assistant LEVINE

The instruction given in the Department of Botany has a threefold purpose:

First, general training in botany as an observational science, familiarizing the students with the meaning and relations of the manifold forms of plants and the principles governing their life processes. For those who wish to pursue the subject of botany professionally excellent opportunities are offered to secure a broad and thorough training in the advanced courses given by the department.

Second, the importance of a scientific knowledge of the laws of plant life being fundamental in agriculture, it is sought in the elementary courses to provide such training as will generally fit the minds of agricultural students to grasp the underlying meaning of familiar field work with crops; such training, moreover, as may be built upon in a carefully graded series of advanced courses.

The third phase of the work of the Department of Botany lies in the investigation of those economic problems in plant life which affect agriculture. Four distinct general lines of work in botany are being conducted in the Experiment Station: Experimental plant breeding; the investigation, prevention and control of plant diseases; physiological investigations in drouth resistance; and seed control, *i. e.*, the determination of the purity and vitality of agricultural seeds for farmers, seedsmen and others.

The equipment for elementary instruction comprises forty compound and sixty-four simple microscopes, a series of Jung, Peter, Kny, and Frank botanical charts, a Bausch & Lomb projection apparatus, and a very full collection of preserved material for general morphology and pathology. For advanced work, Zeiss and Spencer microscopes with apochromatic lenses, a filar micrometer, Bausch & Lomb and Spencer camera lucidas, a Zeiss drawing table, two Zeiss binocular microscopes, and Bausch & Lomb simple microscopes of the highest grade, provided with special camera lucida attachment, are furnished for the use of the

members of the staff and graduate students. A Minot precision microtome, Spencer microtome, embedding and sterilizing ovens, and the usual supplies of reagents and glassware, are provided for histological study.

In physiology, a complete equipment of the Ganong and the Cambridge lines of physiological apparatus and supplies is available. A large, well-equipped dark room, provided with a Folmer & Schwing enlarging, reducing and lantern-slide camera, a field camera of the best type, and a Bausch & Lomb photomicrographic apparatus, affords opportunity for the preparation of botanical photographs, lantern slides, illustrations for bulletins, etc.

A special laboratory is equipped for advanced work in plant genetics, and is provided with instruments of precision employed in quantitative work in plant-breeding investigations, including special forms of apparatus used for taking measurements of organs, a specially designed gravimeter, a Lovibond improved colorimeter, an Egli calculating machine, a comptograph adding machine, a Corelli polar planimeter, specific-gravity apparatus, numerous balances, the usual glassware, etc.

A seed laboratory and herbarium is equipped with a Zeiss binocular and other microscopes, and accessory apparatus, as well as with the standard Kny-Scherer apparatus for testing the purity and vitality of seeds.

For investigations in plant physiology and plant pathology in the Experiment Station, a large laboratory is equipped with apparatus for studying normal and abnormal conditions in plants. The apparatus used for making determinations of fungous and bacterial diseases of plants, and for the study of the life histories of pathogenic organisms, consists in part as follows: two compound microscopes, a Bausch & Lomb binocular monobjective compound microscope, analytical balances, drying ovens, hot-air sterilizers, steam autoclav, steam still, transfer chambers for isolating organisms, pathological tables, research desks, a large supply of glassware for culturing fungi, a soil and air thermograph, a herbarium containing the various genera and species of fungi, and a large and representative collection of specimens illustrating the economic plant diseases.

For general botanical reference there is an excellent herbarium, especially complete for the state of Kansas, and a very full collection of economic fungi. A very good botanical library is available, containing the usual standard texts and reference works, and files of the principal foreign journals.

COURSES IN BOTANY

FOR UNDERGRADUATES

101. GENERAL BOTANY. Freshman year, first semester. Class work, one hour; laboratory, six hours.* Three semester credits. Professor Roberts, Assistant Professor Davis, Mr. Poole, Miss Kirkbride, Mr. Toole.

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

This is a general introduction to botany. A careful study is made of the morphology of the chief great groups of plants, of their elementary physiology and ecology, of the classification and geographic distribution of the plant kingdom, and its economic relation to man. Text: *Fundamentals of Botany*, by C. S. Gager.

Laboratory.—The aim of the laboratory work in this course is to give as thorough a study as may be of the morphology of the chief important groups in the plant kingdom, taken in the order of their relative complexity, and of their probable relations to one another as parts of an evolutionary series. An excellent and very complete series of prepared slides is of assistance in this work. Laboratory outlines are furnished by the department.

104. PLANT PHYSIOLOGY I. Freshman year, second semester. Class work, one hour. Laboratory six hours.* Three semester hours. Prerequisite: General Botany. Assistant Professor Davis, Mr. Poole, Miss Kirkbride, Mr. Toole.

This is a course of lectures, combined with special study of a required text and with reference reading. The principal life functions of plants, responses of plants, such as photosynthesis, digestion, respiration, transpiration and growth, and the responses of plants to environmental conditions and physical stimuli, are studies. The anatomy of the plant, in so far as it relates to the functions concerned, will be studied in some detail. In this course the student gains a general introductory knowledge of the functions and reactions of plants, and learns to regard them from the dynamic standpoint, as working organisms. Text: *Plant Physiology*, by C. R. Barnes.

Laboratory.—A series of typical experiments is followed out in the physiological laboratory and in the greenhouse. Each student is furnished with a set of the necessary apparatus, and learns to apply quantitative methods to the study of functions. Laboratory outlines are furnished by the department.

107. PLANT PATHOLOGY I. Sophomore year, first semester. Class work, one hour; laboratory six hours.* Three semester credits. Prerequisite: Plant Physiology I. Mr. Melchers, Mr. Toole, Mr. Levine.

The diseases affecting the chief economic crops of field, orchard and garden are studied in considerable detail. The etiology of the various diseases and their most evident symptoms are considered. The student learns to recognize at sight the principal plant diseases he is likely to encounter on the farm, in the nursery, and in market-garden work. Physiological and bacterial diseases are considered to some extent, but the time is chiefly devoted to the more important diseases caused by the higher fungi, the life histories of which are studied in some detail. Preventive measures are considered in each case. An extensive collection of preserved pathological material is available. Text: *Fungus Diseases of Plants*, by H. M. Duggar.

Laboratory.—Practical work in the recognition of all the more common diseases of the farm, orchard and garden is accompanied by detailed microscopic studies of diseased tissues and identification of the fungus parasites which cause them. Laboratory outlines are furnished by the department.

113. MEDICAL BOTANY. Sophomore year, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: High-school botany or its equivalent. Mr. Toole.

This course involves a brief survey of the principal plants of the pharmacopœia. Special attention is given to poisonous plants and their identification. Instruction is by lectures.

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

Laboratory.—This comprises the study of plant products used as drugs, and a laboratory study of toxic plants. Laboratory outlines are provided by the department.

116. SEED TESTING. Elective, second semester. Laboratory, three hours. One semester credit. Prerequisite: Course, Forage Crops. Mr. Schmidt.

Considerable time is devoted to the identification of weed seeds and of weed plants, in both the seedling and the adult stages. The student learns to distinguish those seeds which are used as adulterants or as fraudulent substitutes. Practice work is given in making purity and germination tests of seeds, according to the official rules and methods for seed testing.

FOR GRADUATES AND UNDERGRADUATES

201. PLANT PATHOLOGY II. Elective. First semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: Plant Pathology I. Mr. Melchers, Mr. Levine.

This is a continuation of Plant Pathology. The class work consists primarily of a series of lectures pertaining to mycology, considering the subject from the evolutionary standpoint. The classification of fungi causing plant diseases receives considerable attention, and the relationship of the fungi to one another is emphasized. This course is designed to train those who wish to become more familiar with the classification of the fungi, and their morphology; it is essential for those who wish to follow plant pathological work professionally.

Laboratory.—The laboratory work consists of a detailed study of the genera of pathogenic fungi. A large supply of plant-disease material furnishes a basis for these studies.

205. PLANT BREEDING. Junior year, second semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: Plant Physiology I. Professor Roberts.

This subject involves a study of the present knowledge of variation and heredity, as applied to the breeding and improvement of economic plants. The history of the principal theories bearing upon genetic problems is reviewed, and the experimental data are critically considered. The principles underlying the behavior of hybrids are discussed. A survey is given of the practical results achieved in the breeding of plants, together with a scientific analysis of the methods used. Text: *Genetics*, by H. E. Walker, supplemented by lectures and reference reading.

Laboratory.—The course begins with a thorough study of the cell, followed by a study of the homeotypic and heterotypic mitoses, chiefly in *Lilium*, *Erythronium*, and *Ascaris*. This is succeeded by an examination of floral mechanisms, with reference to close- and cross-pollination, followed by biometric work in variation and correlation, and practical work in the calculation of the chief constants of the frequency polygon. The course closes with a laboratory study of Mendelian phenomena.

208. PLANT PHYSIOLOGY II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Plant Physiology I. Assistant Professor Miller, Assistant Professor Davis.

This course offers opportunity for advanced work through lectures, discussions and reference reading of the more special problems in plant physiology.

211. PLANT GENETICS I. Elective, first semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: Plant Breeding. Professor Roberts.

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

The work of Plant Breeding is continued, with special reference to the practical details, technique and history of the breeding of the principal economic plants. Extensive reference reading in the literature is required and a thesis involving a review of the work accomplished in some phase of genetics.

Laboratory.—Experimental work in hybridization, using a considerable variety of forms in order to acquire familiarity with the technique of crossing, and with the range of phaenotypic characters in the species available for investigation. Crosses are made of antithetic characters, using plant material of known behavior.

215. PLANT HISTOLOGY. Elective, second semester. Laboratory, six hours. Two semester credits. Miss Kirkbride.

This course is planned to provide a thorough training in the principles and practice of microtechnical methods in botany, including the killing, fixing and embedding of plant material, microtome work, and the staining and mounting, by various methods, of a tolerably complete and characteristic series of permanent slides, representing the vegetative and reproductive tissues of typical plants, taken from all the principal groups. Text: Chamberlain's *Plant Histology*.

219. ECONOMY BOTANY. Elective, first semester. Class work, one hour; laboratory six hours.* Three semester credits. Prerequisite: General Botany. Professor Roberts.

This course is designed especially for students intending to enter professional work in botany in experiment stations. It involves a study of the history of cultivated plants, with a course of lectures on the chief groups of the higher plants containing economic species. In this connection a very broad survey is taken of the world's economic plants, considerable attention being given to the derivation of economic products, and to methods of cultivation and harvesting. The plants of tropical and subtropical agriculture and horticulture receive considerable attention. Forestry products are not considered. Instruction is imparted by lectures and reference reading. Text: *The Origin of Cultivated Plants*, by De Candolle.

Laboratory.—A microscopic study is made of economic plant products, such as fibers and textiles, food products, spices, etc. Laboratory outlines are furnished by the department.

222. EVOLUTION OF PLANTS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Economic Botany. Professor Roberts.

Careful consideration is given to the lines along which evolution has proceeded in the plant kingdom, to the relationship of the more important phyla and to the probable derivation of the chief groups of plants. Instruction is imparted by means of lectures and reference readings. Text: *Evolution of Plants*, by Campbell.

225. TAXONOMIC BOTANY. Elective, second semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: General Botany.

This course is designed to give biological students a broad training in the systematic relationships, chiefly of the flowering plants. Practice is acquired in the use of manuals or keys to floras, and the student is taught especially to recognize the morphological characters which distinguish the principal orders, families, and genera of the angiosperms. The course is designed to be a strictly practical one, its purpose being to equip the student with the necessary data for recognizing at sight a large number of the plants of the field, mainly of the higher groups,

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

although some attention is also paid to the identification of ferns, mosses and liverworts, and of the commoner algæ and fungi. Instruction is imparted by means of lectures and reference readings.

Laboratory.—The identification, by means of standard manuals and floras, of a large number of native and exotic plants. Considerable field practice is required, and attention is directed to differences in structure which the same species may show under different environments. An endeavor is made to train the student's mind to a broad, comprehensive conception of species-characters, using manuals merely as convenient guides to this end. Laboratory guide, Gray's *Manual of Botany*, seventh edition, revised.

FOR GRADUATES

301. PLANT PATHOLOGY III. Elective, second semester. Library, nine hours.* Three semester credits. Prerequisite: Plant Pathology II. Mr. Melchers, Mr. Levine.

This course is a continuation of Plant Pathology II. Its purpose is to give the advanced student an opportunity for making a closer and more extended study of the pathogenic organism which cause plant disease. The course will include a somewhat detailed study of the cryptogamic herbarium. Considerable attention will be devoted to the growing of pure cultures of pathogenic fungi, the making of inoculations, isolation of fungi, etc. The preparation of media of various kinds for the growing of fungi will receive considerable attention. The course is especially designed for those who intend to pursue plant pathology as investigators in experiment stations.

303. PLANT GENETICS II. Elective, second semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: Plant Genetics I. Professor Roberts.

A more advanced study of fundamental problems in genetics. Such topics as the cytological basis of heredity, mutation and the questions of sex-inheritance and the inheritance of acquired characters receive extended treatment. A reading knowledge of German is required. Baur's *Experimentelle Vererbungslehre*, second edition, is read in class, and extensive topical reference reading is required in other German handbooks, and in the original literature.

Laboratory.—Experimental work in hybridization, carried on in the greenhouse, is continued in this course.

307. PLANT GENETICS III. Elective, second semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: Plant Genetics II. Professor Roberts.

The work of the preceding course is continued in general character, except that individual problems begin to be developed. A reading knowledge of German is required.

Laboratory.—Problems in plant genetics are taken up individually and hybrids are investigated experimentally.

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

Chemistry

Professor WILLARD	Instructor GUTSCHE
Associate Professor KING	Instructor BURCHARD
Associate Professor SWANSON	Assistant McCLUNG *
Assistant Professor NEWMAN	Assistant ZOLLER
Assistant Professor HUGHES	Assistant K. REED
Assistant Professor BRUBAKER	

All of the industries are becoming more and more dependent for their highest success upon intelligent application of the sciences, and the social sciences are making their greatest progress by tracing their phenomena back to the physical and chemical changes that accompany them. A study of chemistry and physics is therefore essential to any understanding of the processes of nature or of human industry. In the instruction in chemistry, the aim is to insist upon a mastery of the chief concepts of the pure science through the agency of textbook drill, accompanied by demonstrations in the lecture room, and experimental observation by the student himself in the laboratory. As the course proceeds, illustrations of chemical principles are drawn from the industrial processes of the chemical, agricultural, domestic, and other arts, thus impressing upon the mind the practical nature of the study. The ultimate object of instruction in this science is to develop in the student the power to form independent judgment upon the manifold problems of daily life in which chemistry plays a part.

The lecture rooms are amply equipped for experiments and demonstrations, and the laboratories are designed to accommodate 864 students each semester in freshman work and qualitative analysis. The laboratories for more advanced work provide space for 324 students, and are well supplied with general and special facilities. The State work in foods, feeding stuffs, and fertilizers, and the chemical investigations of the Experiment Station in soils, crops, animal nutrition, etc., afford unusually good opportunities for students to obtain experience in practical chemistry. In all of the laboratory work the student is required to give the designated amount of time, and at least a certain amount of work must be satisfactorily performed in order to obtain credit.

COURSES IN CHEMISTRY

FOR UNDERGRADUATES

101. CHEMISTRY I. Freshman year, both semesters and summer school. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: High-school Physics. See Chemistry HE-I, and HE-II. Associate Professor King, Assistant Professor Newman, Mr. Gutsche, Mr. Burchard, Mr. Zoller, Mr. Reed, and Mr. ———.

This work begins the study of general chemistry, and is designed, with that of the succeeding semesters, to give the student a knowledge of the fundamental principles of chemistry. As all subsequent progress in this science requires a working knowledge of its principal theoretical conceptions, the principles of nomenclature, the significance of formulas, chemical equations, etc., much attention is given to these, while at the same time the practical uses of the substances, and the processes used in metal-

* Transferred to Department of Bacteriology.

iurgy, engineering, agriculture and other arts are emphasized. McPherson and Henderson's *A Course in General Chemistry* is used as a textbook, this semester's work covering the first 412 pages. The text is supplemented by lectures and is amply illustrated by experimental demonstrations.

Laboratory.—As far as time permits, the student performs independently experiments touching the preparation and properties of the more important substances. Preference is given to those operations which illustrate important principles, and the student is required, as far as possible, to study experiments in that light. In this, as in all other laboratory work in chemistry, the objects are to illustrate chemical phenomena, and to teach care in manipulation, attentive observation, logical deduction, and discrimination and accuracy in recording results and conclusions. The student is required to give the designated amount of time, and a minimum amount of work must be satisfactorily performed in order to obtain credit. *Laboratory Exercises in Elementary Chemistry*, by William McPherson, is used as the laboratory guide.

102. CHEMISTRY II. Freshman year, both semesters and summer school. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: Chemistry I. See Chemistry HE-I and HE-II. Teachers same as for Chemistry I.

The work in this course for the first half of the semester is a completion of the study of general chemistry begun the preceding semester. The second half of the semester is devoted to the study of the general principles of qualitative analysis as outlined in an *Elementary Treatise on Qualitative Analysis*, by William McPherson.

Laboratory.—In the laboratory the student studies the ordinary methods of separation and detection of the more common metals, nonmetals, acids, bases and salts. The teaching of analysis as such is a secondary object, although the student is held to the exact observation and careful reasoning required in ascertaining the composition of single substances and mixtures. The effect of the course is to broaden, strengthen and unify the students' ideas of general chemistry.

103 and 104. CHEMISTRY HE-I AND HE-II. Freshman year, both semesters and summer school. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisites and teachers same as for Chemistry I and II.

These courses cover the work in general chemistry and qualitative analysis. The relative amount of time spent upon these subjects is the same as with Chemistry I and II. Throughout the work, both in class and laboratory, special emphasis is placed upon those facts of everyday life in and about the home which possess special value to young women. Textbook: *Inorganic Chemistry for Colleges*, by Newell. The laboratory guide for the general chemistry is *A Laboratory Manual for General Chemistry*, by McPherson and Henderson, accompanied by mimeographed material on special subjects. The laboratory guide for the qualitative analysis is *Elementary Treatise on Qualitative Analysis*, by William McPherson.

105. CHEMISTRY VET-I. Freshman year, first semester. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Assistant Professor Brubaker.

This course deals with the fundamental laws of and theories of chemistry, the elements and their inorganic compounds, laying emphasis on those substances which are used in medicine, and including a study of their physiological properties.

Laboratory.—The laboratory work is intended to give the student first-hand knowledge of the substances studied by testing their properties in the laboratory, and an introduction to the systematic qualitative analysis of inorganic substances.

106. CHEMISTRY VET-II. Freshman year, second semester. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: Chemistry Vet-I. Assistant Professor Brubaker.

This course follows Chemistry Vet-I and has the same general object, but deals chiefly with the organic compounds. Consideration is also given to the methods of examining blood, gastric contents, milk, and urine.

Laboratory.—The laboratory work consists in qualitative and quantitative tests of the substances studied.

120. ORGANIC CHEMISTRY. Sophomore year, both semesters and summer school. Lectures and recitations, two hours; laboratory, three hours. Three semester credits. Prerequisite: A college course in general chemistry. Assistant Professors Hughes and Brubaker, and Mr. Zoller.

A systematic study is made of the simpler examples of the more important classes of organic compounds in their logical chemical relations. Such substances as touch the everyday affairs of life are treated in greater detail. Opportunity is thus afforded to consider the hydrocarbons, alcohols, organic acids, fats, soaps, sugars, starch, proteins, and other less-known substances. Compounds used for clothing, fuel, light, antiseptics, disinfectants, anesthetics, poisons, medicines, solvents, etc., are included. While especial attention is given to the useful organic compounds, the study of others is not excluded, when they contribute to an understanding of the systematic relations existing among the several groups. Any serious study of the biological sciences, or of the arts connected with them, must require this as a foundation, and a knowledge of the properties of organic compounds finds frequent application in engineering as well. The subject is amply illustrated by experiments in the lecture room. Text: Norris's *Organic Chemistry*, in part, accompanied by lectures amplifying certain parts of the subject.

Laboratory.—The laboratory work includes experiments and preparations touching the more important compounds studied in the lectures and recitations, especially fats, carbohydrates and proteins.

121. ORGANIC CHEMISTRY HE. Sophomore year, both semesters and summer school. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisites and teachers same as for Organic Chemistry.

The lectures and recitations in this course are the same as in Organic Chemistry, with additional emphasis placed on the organic compounds most intimately related to daily life in the home. Text: Norris's *Organic Chemistry*, in part, accompanied by lectures amplifying certain parts of the subject.

Laboratory.—The laboratory work includes preparations, and qualitative and quantitative experiments touching the more important compounds studied in the lecture and recitations. Especial emphasis is placed on the organic compounds found in fuels, foods, fabrics, disinfectants and other materials used in and about the home. Laboratory guide, *Experiments in Descriptive Organic Chemistry*, by Alice F. Blood.

130. HUMAN NUTRITION. Junior year, both semesters. Lectures and recitations, three hours. Three semester credits. Prerequisite: Acceptable courses in human physiology and organic chemistry. Professor Willard and Assistant Professor Hughes.

This is a course in the chemistry of foods and nutrition, and includes, among others, the following topics: The composition of the body; the composition of foods, and methods of investigation employed in their study; the changes that the several classes of foods undergo in cooking and digestion, and the functions that they perform in nutrition; daily food requirements, and the blanching of dietaries; food economy. *Chemistry of Food and Nutrition*, by H. C. Sherman, is used as textbook, but is supplemented by lectures.

150. QUANTITATIVE ANALYSIS I. Sophomore or junior year, first semester. Laboratory, six hours. Two semester credits. Prerequisites: Chemistry I and II. Assistant Professor Brubaker.

This course is planned to give the student a knowledge of the simpler operations in gravimetric analysis and volumetric analysis and to lay the foundation for studies in which such knowledge is required. Particular emphasis is laid on the importance of exact quantitative work and its value in investigations connected with agriculture. Textbook: *Quantitative Analysis*, by Frank and Clemans.

FOR GRADUATES AND UNDERGRADUATES

201. ADVANCED INORGANIC CHEMISTRY. Elective, first semester. Class work, five hours. Five semester credits. Given in 1918-'19 and alternate years thereafter. Prerequisite: Chemistry II or Chemistry HE-II. Associate Professor King.

The course consists of a thorough study of the facts of chemistry and their theoretical interpretations according to the views of the present day. Special stress is placed upon the properties of the elements as a basis for methods of classification, and upon the rarer elements and compounds. Text: *Modern Inorganic Chemistry*, by J. W. Mellor.

202. INORGANIC PREPARATIONS. Elective, first semester. One semester credit for each three hours of laboratory work. Prerequisite: Chemistry II or Chemistry HE-II. Associate Professor King.

Students of Advanced Inorganic Chemistry are advised to take this course. It consists in the preparation and purification of some typical inorganic compound, together with those of a more complex composition and compounds of the rarer elements.

203 and 204. INDUSTRIAL CHEMISTRY I AND II. Elective, first and second semesters, respectively. Given in 1917-'18 and alternate years thereafter. Class work, three hours; laboratory, six hours. Five semester credits each semester. Prerequisite: Organic Chemistry. Associate Professor King and Mr. Gutsche.

This course treats the more important technical processes. Considerable attention is given to general operations and the machinery employed. The more important commercial manufacturing industries are then taken up, including, with others, the production of alkalis, acids, glass, clay products, cement, paint, pigments, oils, varnish, soap, gas, paper, leather, petroleum, sugars, starch, and the products of fermentation, and the destructive distillation of wood and coal. Textbook: *Manual of Industrial Chemistry*, by Rogers and Aubert.

205. INDUSTRIAL ELECTRO-CHEMISTRY. Elective, second semester. Offered in 1918-'19 and alternate years thereafter. Class work, two hours. Two semester credits. Prerequisite: College courses in general chemistry and physics. Assistant Professor Brubaker.

In this course will be treated briefly the principles of voltameters, electro-mechanical methods of analysis, electroplating, electrotyping and the production of metallic objects by electrolytic methods. This will be followed by fuller treatment of electrolytic refining of metals, the manufacture of various industrial products by electrolytic methods, primary cells, the lead storage battery, the Edison storage battery, the electro-metallurgy of iron and steel, and the fixation of atmospheric nitrogen. Textbook: Thompson's *Applied Electrochemistry*.

206. PHYSICAL CHEMISTRY. Elective, second semester. Given in 1918-'19 and alternate years thereafter. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: Chemistry II or Chemistry HE-II. Associate Professor King.

This course is especially adapted to meet the needs of students intending to specialize in soils, as well as those students in other divisions, who desire a broader knowledge of the more fundamental laws of chemistry. In this course emphasis is placed upon the study of gas laws, osmotic pressure, surface tension, solution, colloidal solutions, thermochemistry, equilibria, and electrical conductors.

Laboratory.—In the laboratory the subject matter discussed in the lectures is investigated experimentally.

220 and 221. ORGANIC CHEMISTRY I AND II. Elective and graduate, first and second semesters, respectively. Given in 1918-'19 and alternate years thereafter. Lectures and recitations, three hours; laboratory, six hours. Five semester credits, each course. Prerequisite: College course in organic chemistry. Assistant Professor Hughes.

This course includes a careful, systematic study of aliphatic and aromatic compounds to such an extent as time permits. Text: Perkin and Kipping's *Organic Chemistry*.

Laboratory.—The laboratory work includes preparation and purification of a number of compounds selected from the aliphatic and aromatic series for the illustration of important synthetic reactions. In addition to the verification of the constants of these compounds the important qualitative tests are made which are characteristic of the classes of compounds. Laboratory guide, Jones's *A Laboratory Outline of Organic Chemistry*.

230. PRINCIPLES OF ANIMAL NUTRITION. Elective and graduate, second semester. Class work, three hours. Three semester credits. Prerequisite: Organic Chemistry. Assistant Professor Hogan.

This course gives a thorough study of the relations of animals to matter and energy, and the physiological principles involved. Study of the researches which have established the principles of nutrition constitute the ground work of the course.

231. PHYSIOLOGICAL CHEMISTRY. Elective and graduate, second semester. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: An acceptable course in organic chemistry. Assistant Professor Hughes.

This course is designed to meet the needs of students who expect to specialize in nutrition or one of the biological sciences. It is a systematic study of the synthetic and analytical chemical changes that accompany the physiological processes of animals and plants. The chemical properties of food and body substances, and their general specific functions; the changes that take place in digestion, assimilation and elimination, and the means by which these are brought about; enzymes and their functions; the blood and lymph; general metabolism, and the interrelations of organs, are among the important topics studied. Text: Mathews' *Physiological Chemistry*.

Laboratory.—The laboratory work is designed to familiarize the student with the compounds and processes discussed in the lectures and recitations. Laboratory guide: Mathews' *Physiological Chemistry*.

240. ADVANCED QUALITATIVE ANALYSIS. Elective and graduate, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Chemistry II. Assistant Professor Newman.

This course is designed to broaden the student's knowledge of chemistry by a systematic study of the properties of the acid and basic elements and their compounds as shown in a detailed study of systematic analysis. Many of the rarer elements are included. A study of the application of chemical theory to analytical reactions is taken up in considerable detail with the aim of familiarizing the student with the important theories as applied to analytical procedure. Reports are made on assigned reference work.

250. QUANTITATIVE ANALYSIS II. Elective and graduate, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Chemistry II. Assistant Professor Brubaker.

This course covers the general procedure of gravimetric analysis and volumetric analysis, together with a discussion of chemical theory as applied to quantitative reactions. Particular attention is paid to the commercial significance of the procedures studied. The work for the first part of the semester consists of a selected series of gravimetric determinations designed to develop accuracy in a number of fundamental operations. The second part of the semester, solutions of acids, bases and oxidizing agents are standardized and used in analysis. Reports are made on assigned reference work for the study of methods of analysis not taken up in class. Textbook: *Quantitative Analysis*, by Edgar G. Mahin.

251. QUANTITATIVE ANALYSIS III. Elective and graduate, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Quantitative Analysis I. Assistant Professor Brubaker.

This is a continuation of Quantitative Analysis II and applies the fundamental principles of quantitative work to the analysis of important industrial products and raw materials. The applications of analytical methods to commercial analysis, together with the chemical theories underlying these methods are emphasized. Textbook: *Quantitative Analysis*, by Edgar G. Mahin.

252. CHEMISTRY OF SOILS AND FERTILIZERS. Elective and graduate, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Quantitative Analysis I. Associate Professor Swanson.

The class work takes up the chemical composition of soils and fertilizers, and those chemical changes in the soil which are most important in affecting plant growth. Attention is also given to colloids and soluble salts in relation to optimum soil conditions. The course is adapted especially to the needs of students of soils.

Laboratory.—The laboratory work is planned to give the student a knowledge of the most important chemical methods used in the analysis and investigation of soils and fertilizers.

253. CHEMISTRY OF PLANT PRODUCTS. Elective and graduate first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Organic Chemistry and Quantitative Analysis I. Associate Professor Swanson.

In the class work a detailed study is made of the chemical composition of substances present in plants and plant products; the most important chemical transformations which take place in plant growth; and enzymes and colloids in relation to plant substances and plant growth.

Laboratory.—The laboratory exercises are planned to give the student a working knowledge of the most important methods used in the analysis and investigation of substances present in plants and plant products.

254. DAIRY CHEMISTRY. Elective and graduate, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Organic Chemistry and Quantitative Analysis I. Associate Professor Swanson.

The class work is centered chiefly upon the following: A detailed study of the chemical compounds present in milk, butter, cheese, and other dairy products; chemical changes affected by conditions of handling dairy products; a review of literature relating to recent investigational work in dairy chemistry.

Laboratory.—The laboratory exercises are designed to give the student a working knowledge of the most important chemical methods used in the analysis and investigation of dairy products.

255. CHEMISTRY OF MEATS. Elective and graduate, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Organic Chemistry and Quantitative Analysis I. Associate Professor Swanson.

The class work includes the following: A detailed study of the chemical compounds present in the edible portions of meat animals; chemical changes effected by different methods of preparing and storing meat products; a review of recent literature relating to investigational work in the chemistry of meat and meat products.

Laboratory.—The laboratory exercises are designed to give the student a working knowledge of the most important chemical methods used in the analysis and investigation of meats and meat products.

256. RESEARCH WORK IN AGRICULTURAL CHEMISTRY. Elective and graduate, both semesters. One semester credit for each three hours of laboratory work or equivalent. The prerequisites depend upon the nature of the work the student wishes to take up. Associate Professor Swanson.

In this course the student may study a special chemical problem in connection with such subjects as feeds, soils, fertilizers, flour, dairy products, silage, preparation of special feeds for use in animal nutrition, etc. The chemical investigations of the Experiment Station in soils, fertilizers, feeds, crops, silage, flour, animal nutrition, etc., afford unusually good opportunities for students to obtain experience in agricultural chemical investigations.

260. ADVANCED QUANTITATIVE ANALYSIS. Elective and graduate, both semesters. One credit for each three hours of laboratory work. Prerequisites: Quantitative Analysis I, or Quantitative Analysis II and III. Assistant Professor Brubaker.

Under this heading provision is made for the election of any kind of quantitative chemical work not otherwise designated. The various research and state laboratories afford a large opportunity for advanced work.

265. HOUSEHOLD CHEMISTRY. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Organic Chemistry. Assistant Professor Brubaker.

The lectures cover the chemistry of numerous problems of air, water, soap, laundering, dry cleaning, food and cookery, and textiles. A portion of the lecture time is given to reciting on the subject matter of previous lectures and of the laboratory work. References are given for study.

Laboratory.—The laboratory work consists largely of quantitative exercises dealing with air, water, soap, foods, food accessories, and textiles.

275. SEMINAR. Once a week, throughout the year, the officers of the department, with the more advanced students and such others as wish to, meet for papers and discussions upon topics representing the progress of chemical science, chiefly as found in the current journals. The preparation of subjects for presentation at these meetings may be made a part of the credit work of advanced students.

Economics and Sociology

Professor KAMMEYER
Assistant Professor MACKLIN

Vocational training alone does not fully prepare a student for his life work, nor for the acceptable discharge of his duties as a citizen. It is necessary that he should have at least a general knowledge of the economic and social conditions under which he will live and work, in order that he may become a useful member of society. The State needs men and women trained for citizenship. It is the purpose of this department to plan and direct its work with this need in view.

A department library of well-selected books and pamphlets bearing on economics, sociology, and statistics is at the disposal of the students, and is used for collateral readings, book reviews, and reports.

COURSES IN ECONOMICS

FOR UNDERGRADUATES

101. ECONOMICS. Junior and senior years, both semesters and summer school. Class work, three hours. Three semester credits. Professor Kammeyer.

A study of economic principles underlying the phenomena of production, consumption, exchange, and distribution of wealth, including a general survey of the State in its relation to industry, transportation, public utilities, insurance, socialism, etc. Instruction by recitations and lectures. Text: Ely's *Outlines of Economics*.

102. AGRICULTURAL ECONOMICS. Elective, both semesters. Class work, three hours. Three semester credits. Assistant Professor Macklin.

Clear thought and sound judgment, upon the problems that confront the individual, are essential to success in any phase of agricultural production. The course in agricultural economics undertakes to familiarize the student with the economic principles and forces with which every farmer must deal. The relative profitability of farm enterprises, the proportion in which the factors of production should be combined for optimum results, and other phases of production are followed by the laws of values and the important questions connected with the exchange of farm products and the ultimate distribution of farm wealth. The course is conducted by lectures, texts and supplementary reading. Texts: Taylor's *Agricultural Economics*; and Ely and Wicker's *Elementary Principles of Economics*.

FOR GRADUATES AND UNDERGRADUATES

204. BUSINESS ORGANIZATION. Junior or senior year, both semesters. Class work, one hour. One semester credit. Prerequisite: Economics. Professor Kammeyer.

A study of individual proprietorship, partnership and corporation as forms of business organization and management; the advantages and disadvantages of each, and legislative restrictions. The selling plans, advertising methods and systems of credits and collections used by typical manufacturing and distributive industries are made the basis of study and reports. Attention is given also to the origin and operation of markets and exchanges, cost accounting, and special systems of wage payment. Instruction is by recitations, lectures, and reports. Text: Briscoe's *Economics of Business*.

219. AGRICULTURAL LAND PROBLEMS. Elective, both semesters. Class work, one hour. One semester credit. Prerequisite: Agricultural Economics. Assistant Professor Macklin.

The practical exhaustion of free land, rising prices, increasing tenancy and steadily declining soil fertility have produced unusual interest in land problems. The conditions essential to the best productive use of land together with the various attempts in different countries to promote the proper use of land by partial or more or less complete land policies provides the basis for the development of helpful views respecting land reforms which are even now pressing for public recognition. The course consists of lectures, reference work, assigned topics and discussions.

222. RESEARCH IN AGRICULTURAL ECONOMICS. Elective, both semesters. Open to a limited number of advanced students only. Hours of work to be arranged by appointment. Credit to be based on the quality and quantity of the work accomplished. Assistant Professor Macklin.

This opportunity is given to a small number of students especially interested in the economic problems of immediate interest to the farmers of Kansas. The facts and the processes of present marketing systems must be known before intelligent changes in them can be suggested. The forces causing undesirable tenancy must be determined before the evils can be eradicated. These subjects and many others are topics for careful research in this course.

COURSES IN SOCIOLOGY

FOR GRADUATES AND UNDERGRADUATES

201. PRINCIPLES OF SOCIOLOGY. Senior year, both semesters and summer school. Class work, three hours. Three semester credits. Professor Kammeyer.

This course is designed to give the students a knowledge of social forces, institutions and ideals, and the fundamental principles of social development. The work is based largely upon discussion, lectures and reports. Text: Blackmar and Gillin's *Sociology*.

207. LABOR PROBLEMS. Elective, first semester. Class work, one hour. One semester credit. Professor Kammeyer.

The history, organization, functions and legal status of labor unions in the United States and the principal countries in Europe. Statistics and judicial decisions relating to strikes, boycotts, picketing, arbitration, etc., are subjects of study and investigation. This course also includes a study of the various plans that have been proposed and tried for the more equitable distribution of wealth, such as coöperation, profit-sharing, industrial partnership, etc. Instruction by lectures, assigned readings, and reports. Text: Croat's *Organized Labor in America*.

210. MONEY AND BANKING. Elective, second semester. Class work, one hour. One semester credit. Must be preceded by a course in general economics. Professor Kammeyer.

A study of money, its history and characteristics as a medium of exchange and a standard of value. Bank currency: its nature, forms, and limitations. The principal banking systems of the world, their machinery and methods; branch banks, clearing houses, foreign and domestic exchange, etc. Special attention is given to the new Federal Reserve Act, its purpose, provisions, and operation. Text: Holdsworth's *Money and Banking*.

213. PUBLIC FINANCE. Elective, second semester. Class work, one hour. One semester credit. Professor Kammeyer.

This course embraces a study of public revenues and public expenditures; the development of tax systems, reforms needed, public indebted-

ness, budgets, and other phenomena of financial administration. Plehn's *Introduction to Public Finance* is used as a basis for recitations. This is supplemented by library work and reports.

216. MARKETING AND COÖPERATION. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Agricultural Economics. Assistant Professor Macklin.

American farmers' organizations have attempted much in the way of reorganizing the process by which agricultural products are transferred from the farm to the consumer as well as in the bettering of farmers as a class. Knowledge of their experience in coöperative undertakings, whether in the line of marketing or production, is essential to a thorough understanding of the situation regarding farmers coöperative organizations and the problems of greater economy in marketing. Following the sketch of the important farmer movements, speculation, market organization, coöperative production, exchange and credit are studied in detail. The course consists of lectures, special topics, assigned readings and discussions. Text: Weld's *The Marketing of Farm Products*.

Education

Professor HOLTON *
Associate Professor KENT
Associate Professor REISNER †
Assistant Professor HALM
Assistant Professor DUNN

The courses in this department have for their controlling purpose the professional training of teachers. Two types of courses are offered: (1) courses that give the broad, fundamental principles upon which public education is based, and (2) courses that develop technique and skill in school management and the organization of the subject matter of the curriculum. All courses are based upon the proposition that education supported by public taxation should function in social and vocational efficiency.

The minimum requirements for the three-year State certificate renewable for life are eighteen semester hours of work in this department. Of these eighteen semester hours, twelve are specified by the State Board of Education, namely, Psychology, Educational Administration, History of Education, and Educational Psychology or Principles of Education. For the remaining six semester hours the teachers' elective group in the Division of Home Economics specifies Home Economics Education and Special Methods in the Teaching of Home Economics, along with Supervised Observation and Teaching. Two credits toward graduation, but no credit toward the State certificate, are allowed for the last named course. The remaining two semester hours may be chosen out of the elective courses in the department.

It is urged that prospective teachers of agriculture elect Agricultural Education and Special Methods in the Teaching of Agriculture, and that prospective teachers of industrial arts subjects elect Industrial Education and Special Methods in the Teaching of Industrial Arts.

* Absent on leave, year 1916-'17.

† Resigned.

The regulations of the State Board of Education allow the acceptance of only one course in special methods for the State certificate. This course must be taken in the student's senior year, in the field of his major work, and must be approved by the Department of Education.

COURSES IN EDUCATION

FOR UNDERGRADUATES

101. **PSYCHOLOGY.** Junior or senior year, first or second semester. Class work, three hours. Three semester credits. Required for State teachers' certificates. Associate Professor Reisner.

This course is a general introduction to the forms and laws of conscious experience as based on a knowledge of the physiological conditions of mental life. It combines the study of selected texts and outside readings with lectures and class experiments.

105. **EDUCATIONAL ADMINISTRATION.** Junior or senior year, first or second semester. Class work, three hours. Three semester credits. Required for State teachers' certificates. Professor Holton.

This course is a study of the organization of state, city and county school systems, with special emphasis upon rural and vocational schools; the interrelation of the functions of boards of education, superintendents, principals, teachers. The school law of Kansas is an important part of the course.

109. **EDUCATIONAL PSYCHOLOGY.** Junior or senior year, first or second semester. Class work, three hours. Three semester credits. Required for State teachers' certificates. Prerequisite: Psychology. Associate Professor Reisner.

The course will deal with those aspects of psychology that have a direct bearing upon educational practices. Attention will be paid to the results of experimental investigations in the field. Lectures and library work.

113. **HISTORY OF EDUCATION.** Junior or senior year, first or second semester. Class work, three hours. Three semester credits. Associate Professors Reisner and Kent.

This course is intended to present the successive relationships that have existed between educational machinery and practices, and the changing political, economic, scientific, cultural and ideal environments from primitive times to the present.

117. **EDUCATIONAL SOCIOLOGY.** Junior or senior year, first or second semester. Class work, two hours. Two credits. Professor Holton.

This course deals with the concrete objectives of education considered as a process of social adjustment the meaning of education in a democracy; the educative functions of the home, the community, the church and the school; the school as a special environment; the meaning of labor and leisure; cultural and vocational education; intellectual and practical studies; and physical and social studies.

121. **HOME ECONOMICS EDUCATION.** Senior year, first or second semester. Class work, two hours. Two semester credits. Required of all candidates for State teachers' certificates who are preparing to teach home economics. Prerequisite: Educational Administration. Assistant Professor Halm.

This course considers problems dealing with the place of home economics in modern secondary education; the aims and the organization of the work in various types of schools; the administration, maintenance, equipment and supervision of departments of home economics. Special attention is paid to Kansas conditions.

125. AGRICULTURAL EDUCATION. Senior year, first semester. Class work, two hours. Two semester credits. Expected of all candidates for State teachers' certificates who are preparing to teach agriculture. Prerequisite: Educational Administration. Associate Professor Kent.

A comparative study is made of the provisions for agricultural education in this and other states and countries and the principles underlying such education. The part played in agricultural education by community, county, state and nation is discussed. Types of schools, courses of study, adjustment of school work to community needs, and the equipment and administration of agricultural schools are studied. The aim of the course is to fit the student to plan, teach and administer or supervise agricultural work, especially in high schools.

129. INDUSTRIAL EDUCATION. Senior year, first semester. Class work, two hours. Two semester credits. Expected of all candidates for State teachers' certificates who are preparing to teach manual training, shop work, trade courses, and other industrial subjects. Prerequisite: Educational Administration. Associate Professor Kent.

This course is a study of typical secondary schools of industrial education and departments of industrial education in public schools; of the industrial schools of Germany and other foreign systems; of the making of a course of study in industrial education for secondary schools; and of shop equipment and costs.

131. SPECIAL METHODS IN THE TEACHING OF HOME ECONOMICS. Senior year, first or second semester. Class work, two hours. Two semester credits. Expected of all candidates for State teachers' certificates who are preparing to teach home economics. Prerequisite: Educational Psychology. Assistant Professor Halm.

This course applies the principles of sound teaching to the selection and development of the subject matter of home economics in lessons for high-school pupils and to the conduct of laboratory and classroom exercises. It is supposed to accompany supervised observation and teaching.

135. SPECIAL METHODS IN THE TEACHING OF AGRICULTURE. Senior year, second semester. Class work, two hours. Two semester credits. Expected of all candidates for State teachers' certificates who are preparing to teach agriculture. Prerequisite: Educational Psychology. Associate Professor Kent.

Training in planning lessons, organizing materials and conducting class and laboratory work in agriculture is the purposes of this course. The work will include observation, criticism and reports of class exercises, a study of work done in high schools, and the making and criticism of lesson plans and outlines. Special attention is given to selecting laboratory materials, conducting laboratory exercises, and adapting class and laboratory work to each other.

139. SPECIAL METHODS IN THE TEACHING OF INDUSTRIAL ARTS SUBJECTS. Senior year, second semester. Class work, two hours. Two semester credits. Expected of all candidates for the state teachers' certificates who are preparing to teach industrial subjects. Prerequisites: Mechanical Drawing II, Woodworking II, and Educational Psychology. Associate Professor Kent.

The various lines of work included under the head of industrial arts are studied and a series of progressive lessons worked out in each of these lines emphasizing important elements. A study is made of the various materials employed and the methods of utilizing them for the needs of pupils. The arrangement of courses, the outline and presentation of assignments, the preparation of assignments, the preparation of laboratory material and the conduct of laboratory exercises are taken

up. The work includes recitation, class discussion, assigned readings and written reports.

SPECIAL METHODS IN THE TEACHING OF PHYSICS. (See Department of Physics.)

141. SUPERVISED OBSERVATION AND TEACHING IN HOME ECONOMICS. Senior year, first or second semester. Laboratory work, six hours. Two semester credits. Prerequisites: Foods I, II, and III; Dressmaking, and Educational Psychology. Assistant Professor Halm.

Students whose qualifications are accepted for this course will serve as teachers of sewing and cooking in the classes of the School of Agriculture.

145. SUPERVISED OBSERVATION AND TEACHING IN AGRICULTURE. Senior year, first or second semester. Laboratory work, six hours. Two semester credits. Expected of all candidates for State teachers' certificates who are preparing to teach industrial arts. Prerequisite: Educational Psychology. Associate Professor Kent.

Students expecting to teach take this work as a part of the regular classes in the School of Agriculture. The work is supervised by a member of the Department of Education and by the regular class teacher. Both teachers criticize lesson plans and presentation.

149. SUPERVISED OBSERVATION AND TEACHING IN INDUSTRIAL ARTS. Senior year, first or second semester. Laboratory work, six hours. Two semester credits. Expected of all candidates for State teachers' certificates who are preparing to teach industrial arts. Prerequisite: Educational Psychology. Associate Professor Kent.

Industrial classes conducted by experienced teachers are visited and careful observations are made in regard to sequence of courses, methods of presentation, interest, class order, and other phases of class work. Reports are presented on this work for discussion. Students are assigned teaching work under careful supervision, results are noted and suggestions are made for individual improvement.

FOR GRADUATES AND UNDERGRADUATES

201. RURAL EDUCATION. Junior or senior year, first or second semester. Class work, three hours. Three semester credits. Prerequisite: Educational Administration. Professor Holton.

This course deals with extension education, boys' and girls' club work, the problems of the rural school, consolidation, social centers, farmers' organizations, and all forms of organized community life in the open country. A certain amount of field work will be done in connection with the course.

FOR GRADUATES

301 and 302. EDUCATION SEMINAR I AND II. Open to candidates for the master's degree. First and second semesters, respectively. Class work, two hours. Four semester credits on completion of both courses; no credit for either separately. Prerequisites: Educational Psychology, and Educational Administration. Professor Holton.

The work consists of lectures, reports and class discussions. Each member of the seminar chooses a topic early in the term for special investigation. Preliminary reports are made to the class from time to time and the final results of the study are embodied in a paper.

English

Professor SEARSON	Instructor SYFORD
Professor MACARTHUR	Instructor COOKE
Associate Professor DAVIS	Instructor BURK
Assistant Professor RICE	Instructor CHRISTOPH
Assistant Professor BOOT	Instructor MACLEAN
Assistant Professor CONOVER	Instructor PAGE
Instructor LEONARD	

Ability to think well and to speak well, and capacity to appreciate the world's best literature, are recognized essentials of a liberal education. The work of the Department of English is to acquaint the student with the best standards of English practice and appreciation, and to encourage him to maintain these standards in all his work. To this end the department offers studies in cultural and technical English and special drills in expressing thought freely and effectively in matters touching the vital interests of the student. The study of the English language and literature is thus made the means of increasing the power and efficiency of the individual. It is therefore the aim of the department, in coöperation with the technical departments of the College, to increase the knowledge and effectiveness of the students.

COURSES IN ENGLISH LANGUAGE

FOR UNDERGRADUATES

101. COLLEGE RHETORIC I. Freshman year, both semesters and summer school. Class work, three hours. Three semester credits. Prerequisite: Three units of high-school English. Professor Searson, Professor Macarthur, Associate Professor Davis, Assistant Professors Rice, Boot, Conover, Miss Syford, Miss Leonard, Mr. Burk, Mr. Cooke, Miss Maclean, Mr. Christoph.

After a series of tests to determine the fitness of the student to pursue the work of the course, a rapid, thorough review of the essentials of English is given, special attention being paid to sentence and to paragraph structure. This is followed by themes designed to develop the student's ability to tell accurately what he knows, to describe interestingly what he sees, and, above all, to enable him to relate the subject of English to the work which he expects to do in after life. Texts: Lomer and Ashmun, *Study and Practice of Writing English*; Cunliffe and Lomer, *Writing of To-day*, first half.

104. COLLEGE RHETORIC II. Freshman year, both semesters. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric I. Professor Searson, Professor Macarthur, Associate Professor Davis, Assistant Professors Rice, Boot, and Conover, Miss Syford, Miss Leonard, Mr. Burk, Mr. Cooke, Miss Maclean, Mr. Christoph.

This course is a continuation of the work in College Rhetoric I. Special emphasis is laid on outlining and on expository and argumentative writing. Attention is directed to practical as well as to literary subjects for the frequent themes written throughout the course. Texts: Canby and others, *English Composition in Theory and Practice*; Cunliffe and Lomer, *Writing of To-day*, second half.

107. SPECIAL ENGLISH. Freshman year, both semesters. Class work, three hours. No credit. Mr. Cooke, Miss Maclean, Mr. ———.

This course is a review of the essentials of English composition, accompanied by drills in sentence structure and in idiomatic expression, by

special exercises and by consultations. It is required of any student assigned to College Rhetoric I who within the first few weeks of the work of that course shows that he is unable to express his ideas clearly and accurately. Textbook: Lomer and Ashmun, *The Study and Practice of Writing English*.

110. ENGINEERING ENGLISH. Senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: College Rhetoric II. Professor Macarthur.

This is an advanced course in English particularly adapted to the needs of engineers. The general problems of engineering writing are discussed. Specific assignments are made in the writing of business letters relating to engineering, and in the preparation of technical manuscripts and reports. A series of essays of especial value to the engineer are read and analyzed. Texts: Watt, *The Composition of Technical Papers*; Aydelotte, *English and Engineering*.

113. ADVANCED COMPOSITION I. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: College Rhetoric II. Assistant Professor Conover.

In this course special emphasis is given to the subject of exposition. The subjects of the themes required are taken as far as possible from the student's particular field of work. Models of reports, explanations and general expository work are carefully studied. Text: Jelliffe, *Handbook of Exposition*.

116. ADVANCED COMPOSITION II. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Advanced Composition I. Assistant Professor Conover.

Narrative writing is studied in this course, both in its relation to the other forms of composition and as an independent form. The practical forms of narrative are studied in detail, and attention is given to the short story. Text: Buck and Morris, *Narrative Writing*.

119. ARGUMENTATION AND DEBATE. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Mr. Burk.

This course includes a systematic study of the theory of debate; brief making; classroom practice in debating, in defending propositions, and in extemporaneous speaking; the proper method of collecting and classifying material; and effective methods of refuting arguments. Consultations, library investigations and special group conferences form helpful laboratory features of the course. Text: Stone and Garrison, *Essentials of Argument*.

122. BUSINESS ENGLISH. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professor Searson, Associate Professor Davis.

This course comprises a thorough review of business forms and general business writing, with special attention to business correspondence and special sales letters. A close study is made of the principles of effective writing as they are found applied in the best writing in the commercial world. Text: Altmaier, *Commercial Correspondence*.

125. ADVERTISING ENGLISH. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Associate Professor Davis.

This course offers a study of the principles of effective English as they are applied in present-day advertising writing. A preliminary survey of the principles of advertising is made in the early part of the course. Later actual practice is given in the writing and printing of the fundamental types of advertisements. Texts: Hall, *Writing an Advertisement*.

128. ORAL ENGLISH I. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric I. Professor Macarthur, Mr. Burk.

In this course a study of the principles of oral composition and practice in oral composition in the form of explanations, narrations, descriptions, selling and other business talks, travel talks and speeches for special occasions are offered. For materials for the exercises given in class, students are directed to cultural subjects, more particularly to painting, sculpture, architecture, and music. Text: Brewer: *Oral Composition*.

131. ORAL ENGLISH II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite, College Rhetoric I. Professor Macarthur, Mr. Burk.

This course is a continuation of Oral English I, but does not require it as a prerequisite. Attention is directed especially to the forms of oral English more commonly employed, such as conversation, the toast or after-dinner speech, introductions, nominations, announcements, presentations, and the like. For reading the students are directed to current magazines so as to be able to discuss current events of all kinds. Text: Brewer, *Oral Composition*.

134. METHODS OF TEACHING ENGLISH. Elective, second semester and summer school. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professor Searson, Associate Professor Davis.

This course is planned to meet the needs of those who are called upon to teach English in connection with the applied sciences. The course of study, the application of English instruction to life needs and definite methods of motivating English instruction are specially considered. Text: Carpenter, Baker, and Scott, *Teaching of English*.

151. COMPOSITION AND LITERATURE I. Freshman year, both semesters. Class work, two hours. Two semester credits. Prerequisite: Three units of high-school English. Associate Professor Davis, Assistant Professors Boot and Conover, Miss Syford, Mr. Burk, Mr. Cooke.

This course consists of a presentation of literary principles with a view to teaching the student how to study and appreciate the best in literature. Masterpieces of drama, of narrative and of lyric poetry are studied intensively in class, and frequent compositions upon the selections studied are required. Textbook: Heydrick, *How to Study Literature*; selected texts in dramatic, narrative and lyric poetry; Lomer and Ashmun, *Study and Practice of Writing English*.

154. COMPOSITION AND LITERATURE II. Freshman year, both semesters. Class work, two hours. Two semester credits. Prerequisite: Composition and Literature I. Professor Macarthur, Assistant Professor Rice, Miss Leonard, Miss Maclean, Mr. Christoph.

This course is a continuation of Composition and Literature I. In it masterpieces of fiction, the essay and the oration are intensively studied. The composition work is continued. Textbook: Heydrick, *How to Study Literature*; selected texts in fiction, the essay, and the oration; Lomer and Ashmun, *Study and Practice of Writing English*.

FOR GRADUATES AND UNDERGRADUATES

201. FARM ADVERTISING. Elective, first semester. Class work and practice, three hours. Three semester credits. Prerequisite: College Rhetoric II. Associate Professor Davis.

How to advertise all kinds of farm produce in order to secure regular customers by parcel post or by direct delivery is the object of this course. The student is shown how to write the most effective copy for "display ads.," "story ads.," and handbills, and how to feature the central point

in each advertisement. The course includes the collection of the most important facts concerning farm produce and such study of markets and marketing as is necessary. Text: Starch, *Advertising*.

204. FARM BULLETINS. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: College Rhetoric II. Associate Professor Davis.

In this course the student is required to make an extensive study of farm bulletins and the essentials of writing good bulletins. How to write in a simple, direct style that appeals to the readers for whom the bulletin is intended is the subject of careful study. Current farm bulletins are made the basis for the work. The student is permitted to take the facts he has collected in connection with the work of other classes and to use them in working out special reports required in this course. The course is designed especially for those who intend later to write farm bulletins.

207. TECHNICAL WRITING. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: One of the following courses: 113, 116, 122, 125, 201, 204. Professor Searson, Professor Macarthur.

This course is planned to help students properly to record and to report technical work. Fundamental principles of technical writing are studied in connection with such practice as will necessitate clearness, accuracy, and effectiveness. Text: Watt, *The Composition of Technical Papers*.

210. HOME ECONOMICS ENGLISH. Elective, second semester. Class work, two hours. Two semester credits. Assistant Professor Boot.

This course recognizes the special needs of women in home, club and social life, and provides a special training to meet those needs. Note taking, outlining and abstracting in home economics; club papers, special reports, books reviews, demonstration talks, social correspondence, and human-interest stories from home environment are considered in this course. Text: Moore, Tompkins and Maclean, *English Composition for College Women*.

251. THE SHORT STORY. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I or Composition and Literature II. Assistant Professor Rice.

Practice in writing short stories, based upon a thorough study of the world's best short stories, is offered in this course. The principles which underlie the material and structure of the short story—plot, setting, action, and character analysis—are especially emphasized. Text: Esenwein, *Writing the Short Story*; Ashmun, *Modern Short Stories*.

254. COMMUNITY ENGLISH. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: English Literature I or Composition and Literature II. Mr. Cooke.

This course comprises the study and practice of the English work most needed in the activities and recreations of community life. A detailed study is made of the pageant. The class is organized as a special group and its members are trained in the various forms of procedure that may be required in the rural community. Text: Bates and Orr, *Pageants and Pageantry*.

FOR GRADUATES

301. HISTORY OF LANGUAGE. Elective, first semester. Class conference, two hours. Two semester credits. Prerequisite: English Literature II. Professor Searson, Professor Macarthur.

This course offers a study of the origin and development of the English language. Text: Wyld's *Historical Study of the Mother Tongue*.

304. SPECIAL STUDIES. Elective, second semester. Class conference, two hours. Two semester credits. Prerequisite: History of Language. Professor Searson, Assistant Professor Conover.

Individual assignments are made in the fundamental fields of research in applied English. The student is required to carry on an original investigation and to make an acceptable report of his research work.

COURSES IN ENGLISH LITERATURE

FOR UNDERGRADUATES

171. ENGLISH LITERATURE I. Sophomore year, both semesters and summer school. Class work, four hours. Four semester credits. Prerequisite: College Rhetoric II. Professor Searson, Associate Professor Davis, Assistant Professor Conover, Mr. Burk, Miss Syford.

In this course the students are made familiar with the principles of literary appreciation and are taught to apply them to selected texts in narrative, lyric and dramatic poetry, as well as in fiction, the essay, and the oration. The work of the course is intensive, notebooks are kept, and frequent tests are given. Text: Heydrick, *How to Study Literature*.

174. ENGLISH LITERATURE II. Sophomore year, both semesters. Class work, four hours. Four semester credits. Prerequisite: English Literature I or Composition and Literature II. Professor Macarthur, Assistant Professor Boot, Assistant Professor Rice, Mr. Cooke, Miss Maclean, Mr. Christoph.

This course presents history of English literature by means of lectures and of discussions of the text. Extensive assignment in reading are made, and report are given in class. Weekly tests are required. Text: Long, *English Literature*.

177. ENGLISH LITERATURE HE-I. Junior year, both semesters. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Associate Professor Davis, Assistant Professor Boot, Miss Leonard, Mr. Burk, Mr. Christoph.

This course offers in slightly condensed form the work given in course 171. Text: Heydrick, *How to Study Literature*.

180. ENGLISH LITERATURE HE-II. Junior year, both semesters. Class work, three hours. Three semester credits. Prerequisite: English Literature HE-I. Professor Searson, Assistant Professor Rice, Assistant Professor Conover, Miss Syford, Miss Maclean.

This course presents a history of English literature in much the same way as course 174. The amount of reading required is slightly less. Text: Long, *English Literature*.

FOR GRADUATES AND UNDERGRADUATES

271. THE ENGLISH BIBLE. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I or Composition and Literature II. Professor Searson.

This course familiarizes the student with the different kinds of literature found in the English Bible. A careful study is also made of the style of that great classic in order to discover the secrets of its simplicity, clearness, and power. Text: Moulton, *Short Introduction to the Literature of the Bible*.

274. THE SHAKSPERIAN DRAMA. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I or Composition and Literature II. Professor Searson, Professor Macarthur.

This course includes a study of Shakspeare's life and times and the reading of ten of his greatest plays. Text: Boas, *Shakspeare and His Predecessors*.

277. NINETEENTH CENTURY LITERATURE. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature II. Professor Macarther, Assistant Professor Conover.

In this course there is discussion of the literary movements found throughout the century, especially in the Victorian period. Significant works are read and are made the subjects of class reports and discussions. Text: Saintsbury, *Nineteenth Century Literature*.

280. AMERICAN LITERATURE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I or Composition and Literature II. Associate Professor Davis, Assistant Professor Rice.

The course consists of lectures on the history of American literature and of class reports on assigned readings. A special study is made of the standard works of the chief American authors. Text: Curtis, Hadden, Page, *Chief American Poets*.

282. CURRENT LITERATURE. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: English Literature I or Composition and Literature II. Miss Syford.

It is the aim of this course to establish a definite basis or standard of literary criticism and appreciation by an inductive study of contemporary literature. The course will include a consideration of the best works of such literary figures as Tagore, Henry James, Maeterlinck, Galsworthy, Anatole France, Thomas Hardy, Tchekov, Bernard Shaw, Selma Lagerlöf, Emile Verhaeren, Arnold Bennett, Stephen Phillips, Wm. Butler Yeats, J. M. Synge, Alfred Noyes, and the younger group.

285. THE NOVEL. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: English Literature II. Assistant Professor Conover.

A study of the English novel, including the discussion of its historical development, its relation to other forms of fiction, and its place in contemporary literature. Especial attention is given to representative works of modern writers, both English and American. Text: Cross, *The Development of the English Novel*.

288. ENGLISH SURVEY I. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature, or its equivalent. Professor Searson, Professor Macarthur.

This course offers an advanced study in the history of English literature. Beginning with Anglo-Saxon times the course continues through the Middle English period down to the close of the Elizabethan period. Text: Garnett and Goss, *History of English Literature*, Vols. I and II.

290. ENGLISH SURVEY II. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: English Survey I. Professor Searson, Professor Macarthur.

This course is a continuation of English Survey I. It traces the rise of Puritanism and its influence on English literature. Emphasis is placed upon the classical movement. A brief survey is made of romanticism and its development. Text: Garnett and Goss, *History of English Literature*, Vols. III, IV.

293. TENNYSON AND BROWNING. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I or Composition and Literature II. Professor Searson.

This course offers a study in the interpretation of some of the best known poems of Browning and Tennyson. Texts: Phelps, *Browning*, *How to Know Him*; Van Dyke, *The Poetry of Tennyson*.

295. THE ARTS AND CRAFTS MOVEMENT. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature, or its equivalent. Professor Macarthur, Miss Syford.

This course takes as its basis the life of William Morris, and treats of the arts and crafts movement in its relation to literature. Works of Morris, Rossetti, Ruskin and other writers of the same group are read and discussed. Text: Mackail's *Life of William Morris*.

FOR GRADUATES

310. THE ROMANTIC MOVEMENT I. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature. Professor Searson, Assistant Professor Conover.

This course offers advanced work in the study of eighteenth century romanticism. Text: Beers, *A History of English Romanticism in the Eighteenth Century*.

313. THE ROMANTIC MOVEMENT II. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature. Professor Searson, Miss Syford.

This course continues throughout the Victorian period the work done in the preceding course. Text: Beers, *A History of English Romanticism in the Nineteenth Century*.

Entomology

Professor DEAN
Associate Professor WELCH
Assistant Professor MERRILL

Assistant Professor TANQUARY
Instructor MCCOLLOCH
Assistant HAYES

In all courses a special effort is made to make the student realize that he is studying living things which form a part of his daily environment, and upon which his welfare in many cases vitally depends. In courses in which both class and laboratory instruction is given the closest correlation is striven for, and wherever possible the same form is studied simultaneously in laboratory and class. The student is led to integrate his classroom knowledge with local animal life by means of frequent and carefully planned field excursions and by the free use of vivaria in laboratory and museum. The courses offered are intended to awaken in the student a keen appreciation of the general principles underlying insect life, of the life economy of the more beneficial as well as of the more injurious species, and of the general principles governing methods for their control.

Standard anatomical charts, a representative collection (especially of local species), a high-grade lantern for the projection of lantern and microscope slides, a large and excellent series of lantern slides (many of them colored) and a series of microscope slides are available for illustration. Compound and dissecting microscopes sufficient for the needs of laboratory classes have been provided.

Facilities for advanced work are provided for graduate students and others who expect to pursue the subject professionally. An advanced laboratory is equipped with individual desks, binocular microscopes, compound microscopes, rotary microtome, imbedded ovens, drawing apparatus, and a supply of glassware and reagents sufficient for histological work and for research. A well-equipped insectary is available for training in insectary methods. An air-conditioning machine in the insectary

adds materially to the possibilities for experimental work. A field station with all of the necessary equipment provides means for the study of insects under normal field conditions.

COURSES IN ENTOMOLOGY

FOR UNDERGRADUATES

101. GENERAL ENTOMOLOGY. Elective, both semesters and summer school. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: General Zoölogy I and II. Professor Dean, Associate Professor Welch, and Assistant Professor Tanquary.

This is a study of the elementary anatomy and physiology of insects, complete enough to give a thorough understanding of the life history and habits of the most important species and the general principles upon which the control of these economic forms is based. It is a study of the more important general facts about insects as a class; the main characters of the different orders and groups; how they survive and multiply; and how the structure and habits of one group render it susceptible to certain measures of control, while in other groups entirely different measures are necessary. The class work consists of lectures and of text and special reference study.

106. HOUSEHOLD ENTOMOLOGY. Elective, first semester. Class work, two hours. Two semester credits. Prerequisites: General Zoölogy I and II. Professor Dean.

This is a study of the elementary structure and physiology of insects, complete enough to give a clear understanding of the life history, habits and methods of control of the principal insects injurious to house, garden, lawn, and human health. The course consists of reference study and a series of lectures.

111. APICULTURE. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: General Entomology. Assistant Professor Merrill.

This course comprises a general study of the structure, life history, general behavior, activities and products of the honeybee. Special attention is given to practical beekeeping, dealing with the best methods practical among beekeepers. A study is made of bee diseases and of the standard methods to be used in the eradication and control of them. A study is also made of the relation of bees to agriculture and horticulture.

116. MILLING ENTOMOLOGY. Junior year, second semester. Class work, one hour. One semester credit. Professor Dean.

This is a study of the insect pests of flouring mills, elevators, granaries, warehouses and bakeries, and of the standard methods to be used in dealing with them. The course consists of lectures and special reference reading. Inspection trips will be made to flour mills and warehouses.

FOR GRADUATES AND UNDERGRADUATES

201. HORTICULTURAL ENTOMOLOGY. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: General Entomology. Assistant Professor Merrill.

This is a study of the most important insect pests of orchard, garden and forest, and of standard methods for controlling their ravages. The class work consists of lectures and the study of references.

206. GENERAL ECONOMIC ENTOMOLOGY. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Professor Dean.

This is a study of the life economy of the more important economic insects, of methods to be used in dealing with them, and of the literature of economic entomology. The student is made familiar with our present knowledge of the most important of our injurious insects, with the sources of economic literature, and with methods commonly used in the investigation of problems in economic entomology. The class work consists of lectures, and of text and special reference reading. Prerequisite: General Entomology.

Laboratory.—The laboratory work consists of the formation and study of a collection of injurious insects, and in insect breeding. This work naturally involves much field study, in the course of which the student gains a first-hand acquaintance with the more important injurious insects at home in nature.

211. INSECT MORPHOLOGY I. Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: General Entomology. Associate Professor Welch.

This course deals exclusively with the external anatomy of representative insects belonging to a number of orders. The types studied are selected so as to present the essentials of the structure of the exoskeleton and to afford a basis for the courses in taxonomy and for professional studies in hexapod morphology.

216. PRINCIPLES OF TAXONOMY. Elective, second semester. Lecture, one hour. One semester credit. Prerequisite: (1) For students taking Taxonomy of Insects I: General Entomology and Insect Morphology I. (2) For students taking Taxonomy of Vertebrates: General Zoölogy I and II. All students registering in either of the above-mentioned courses must also register for this course. Course can not be taken separately. Associate Professor Welch.

This course of lectures deals with the fundamental principles of modern taxonomy. The following subjects are considered in detail: Systems of classification; terminology of taxonomic groups; criteria of species and genera; binomial nomenclature; pre-Linean and modern nomenclature; international code of zoölogical nomenclature, and other codes; law of priority; and modern tendencies in taxonomy.

217. TAXONOMY OF INSECTS I. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisites: General Entomology and Insect Morphology I. Students registering for this course must also register for the course in Principles of Taxonomy. Associate Professor Welch.

This is a study of the general principles of the classification of representative insects. The purpose of the course is so to familiarize the student with the literature, methods and ideals of classification that he will be able to identify unknown forms and to pursue advanced taxonomic studies.

221. ADVANCED GENERAL ENTOMOLOGY. Elective, first semester. Class work, three hours. Three semester credits. The class work consists of lectures, assigned readings and written reports. Prerequisite: General Entomology. Associate Professor Welch.

The purpose of this course is to give the advanced student a comprehensive view of the broad biological aspect of the subject and an understanding of the relation of insects to the complex of environmental factors. The various subdivisions of entomology are correlated and used as a basis in the presentation of general principles as well as illustrating the problems of maintenance and the various ways in which insects have solved them. The course includes, in part, a detailed consideration of the following: Phylogeny of insects and their relatives; metamerism; reproduction; gynandromorphism; parthenogenesis; paedogenesis; polyembryony; respiration; temperature; embryology; internal and external

metamorphosis; metabolism; aquatic insects, their evolution, adaptations, and activities; regeneration; experimental work with insects; insect parasitism; color and coloration; insects in relation to other organisms; insect behavior; and geological and geographical distribution.

226. MEDICAL ENTOMOLOGY. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: General Entomology. Assistant Professor Tanquary.

The subject matter of this course deals with insects and other arthropods as transmitters and disseminators of disease, attention being confined to that phase of the subject which pertains to the health of man. Emphasis is placed on the various important species of insects which are related to disease, the pathogenic organisms and their relation to insects, and the preventive measures which have, up to date, proved most effective. Some attention is also given to the important theories which underlie this subject and to important investigations in progress at the present time.

Laboratory.—The laboratory work consists of a careful study of insects and other arthropods which may affect the health of man directly, and of those which may be instrumental in the dissemination of disease; also a study of the causative organisms of certain insect-borne diseases and the methods by which these organisms are transmitted.

231. ENTOMOLOGICAL AND ZOÖLOGICAL LITERATURE. Elective, first semester. Lectures, one hour. One semester credit. Prerequisite: General Entomology. Associate Professor Welch.

This course deals with the literature of entomology, special consideration being given to bibliographical works and their uses. Since the literature of entomology is, to a considerable extent, inseparably associated with that of zoölogy, the course is of equal importance to the students of both subjects. The course is designed primarily to meet the needs of advanced undergraduate and graduate students who are beginning research work. General and special bibliographical sources, foreign and American scientific journals and serials, and the construction of special bibliographies according to approved methods constitute the chief subjects for consideration. All advanced students of entomology and zoölogy are expected to arrange for this course.

236. ZOÖLOGICAL AND ENTOMOLOGICAL SEMINAR. Elective, both semesters. One two-hour session each week. One semester credit. Prerequisite: Consult seminar committee.

This course consists in the presentation of original investigations, reviews of papers appearing in current journals, summaries of recent advances in the various fields, and discussion of the various aspects of the fundamental problems of modern biology.

FOR GRADUATES

301. INSECT MORPHOLOGY II. Elective, first semester. Laboratory, nine hours. Three semester credits. Prerequisite: Insect Morphology I. Associate Professor Welch.

This course is designed for those advanced students who desire more thorough preparation in the essentials of insect anatomy than is provided for in Insect Morphology I. More extensive studies of detailed external and internal anatomy are made and preparation is afforded for advanced work in taxonomy and research in morphology.

306. TAXONOMY OF INSECTS II. Elective, second semester. Laboratory, nine hours. Three semester credits. Prerequisite: Taxonomy I and Insect Morphology II. Associate Professor Welch.

This course provides for a more comprehensive preparation in the field of insect taxonomy. At the discretion of the instructor, the work

may be taken in such a way that either a broader acquaintance with insects and the principles of classification is afforded, or intensive work may be done on selected restricted groups.

311. INSECT HISTOLOGY. Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisites: General Entomology, and General Cytology. Associate Professor Welch.

This course is designed primarily for students who expect to do technical work in entomology. The work of the laboratory consists of the application of those special methods of gross and microscopical technique which are applicable to insects. Practice in the use of the various special methods of killing and fixing, clearing, sectioning, staining and mounting the various groups of insects and insect tissues afforded. A study of insect tissues constitutes an important part of the course. The lectures deal with the more general matters of technique and insect histology.

316. RESEARCH IN ENTOMOLOGY. Advanced students having sufficient fundamental training may, with the approval of the head of the department, undertake original investigation in one of the following fields of entomology: taxonomy, morphology, economic entomology. Such work is pursued under the direct supervision of some member of the departmental faculty and the final results may, if of sufficient merit, be used to fulfill the thesis requirement for the master's degree. The special student may, if willing and capable, be drawn into the research work of the Agricultural Experiment Station during the summer vacation and receive training in the investigation of economic problems. Prerequisites: (1) For research in taxonomy and morphology: General Entomology, Insect Morphology I, Taxonomy of Insects I, and Cytology. (2) For research in economic entomology: General Entomology, General Economic Entomology, Insect Morphology I, and Taxonomy of Insects I. Professor Dean, Associate Professor Welch, Assistant Professor Merrill, Assistant Professor Tanquary, and Instructor McColloch.

Geology

Professor NABOURS
Assistant Professor NEWMAN
Instructor DICE

By use of abundant illustrative material, an effort is made to have the student realize that he is dealing with natural forces which intimately affect his own well-being and that of his fellows. The agencies that have made the earth what it is are observed and studied in the field. The purpose of these courses is to arouse in the student an appreciation of the general principles underlying the structure and formation of the earth.

Some charts, a series of lantern slides, a representative collection of fossils and minerals, and a surrounding country exhibiting considerable variety of hill and valley, limestone, glacial drift and sand dunes, are available for illustrative purpose.

COURSES IN GEOLOGY

FOR UNDERGRADUATES

101. DYNAMIC AND STRUCTURAL GEOLOGY. Elective, first semester. Class work, two hours; two field trips during the semester. Two semester credits. Professor Nabours and Doctor Dice.

This course consists of a brief study of the structure of the earth, and of the agencies by which rocks are formed or destroyed and the topographic features of the earth produced. Text: *Introductory Geology*, by Chamberlain and Salisbury.

102. ENGINEERING GEOLOGY. Elective, second semester. Class work, two hours; laboratory, six hours. Four semester credits. Required in the course in civil engineering. Professor Nabours and Assistant Professor Newman.

The class work consists of a study of the general principles of structural and dynamic geology, and of rocks in respect to their mineral composition, structural properties, changes in weathering, etc. It is given by lectures, textbooks, and references.

Laboratory.—The laboratory work comprises the observation and description of such structural and dynamic features as the locality affords, and a study of the principal rocks, and their mineral constituents.

FOR GRADUATES AND UNDERGRADUATES

201. HISTORICAL GEOLOGY. Elective, second semester. Class work, two hours; two field trips during the semester. Two semester credits. Prerequisites: Geology 101, Elementary Zoölogy, and General Botany, or equivalent. Doctor Dice.

This course takes up a brief study of the history of the earth as shown by the record in the rocks. Special emphasis is placed on the history of life as indicated by the fossils.

History and Civics

Professor PRICE
Associate Professor ILES
Assistant Professor TAYLOR *

Assistant Professor JAMES
Assistant Professor PEINE
Instructor REYNOLDS

Training for citizenship, breadth of view, historic-mindedness, fairness of judgment and general culture are constant and specific aims of each course offered by the Department of History and Civics. As a result of the training received in these courses the student is better prepared to understand and appreciate the institutions in the midst of which he lives and of which he is a part. He is also prepared to act more wisely his part as a leader in good citizenship wherever his lot may be cast. In our modern age and self-governing nation, and in an institution supported by the State and Nation, it would seem to be the imperative duty of every student to secure specific training for wise and effective leadership in the governmental affairs of the State and Nation that are thus preparing him for life and its duties.

COURSES IN HISTORY

FOR UNDERGRADUATES

101. AMERICAN HISTORY I (or BEGINNING OF THE AMERICAN NATION). Junior or senior year. Both semesters and summer school. Class work, three hours. Three semester credits. Professor Price.

This course gives special emphasis to the industrial phases of the origin and development of American nationality and democracy to the end of the War of 1812. It also includes our constitutional and political development, especially with reference to origin, basis, cause, and effect.

* Absent on leave, year 1916-'17.

It aims to develop historic-mindedness; that is, training the student to put himself in the other fellow's place and understand fairly "the why." The European origin and background of American history, the evolution of colonial life, industries, and institutions; why we became an independent nation; our westward expansion; the establishing of nationality, and the development of government by the people, are phases definitely emphasized. Instruction is given by means of lectures, readings, and recitations.

105. AMERICAN INDUSTRIAL HISTORY. Elective, both semesters and summer school. Class work, three hours. Three semester credits. Assistant Professor Taylor.

This course covers: (1) a study of the physical geography, geology, climate, etc., of the American continent and how these have affected American history and institutions; (2) a study of the discovery and colonization of America—the impelling motives, the life, occupations, religion, psychological temperament, political institutions, etc., of the people, of the attitude of the mother country toward colonization and the colonists, and of the later history of immigration; (3) the influence of the frontier on American history and development; (4) a study of the South before the war (under slavery), and of the new South as it has been developed since the war, including a comparison of the South with New England and the West; (5) a study, running throughout the course, of the life and the industries or occupations of the people. This course is based on *Outlines of American Industrial History*, prepared by the department; but special use is made of such texts as Bogart's *Economic History of the United States*, and Coman's *Industrial History of the United States*. Instruction is given by means of lectures, assigned readings, and reports.

121. ENGLISH HISTORY. Sophomore year, semesters and summer school. Class work, three hours. Three semester credits. Students who offer English history for entrance should take American History II instead of this course for College credit. Assistant Professor Taylor.

This course traces the story of the growth of England from the Britain of the earliest time to the British empire of to-day. The political history is clearly traced, but emphasis is laid upon the constitutional development, and the practical working of the present government is carefully studied. Much emphasis is given to the industrial and social development of the people, especially to the more recent industrial revolution. One of the especially interesting features of this course is the study of England's institutions and government as her colonial empire emerged, and the conditions under which the United States of America became independent of England. While this is primarily a textbook course, with Cheyney's *Short History of England* as the text, supplementary reading is required.

122. FRENCH HISTORY. Elective, first semester. Class work, three hours. Three semester credits. Assistant Professor Taylor.

The story of the growth of the French nation is traced from the days when Gaul was a Roman province, through the fall of Rome and the German conquest to the development of the Christian church and of the institution of feudalism. Then occurs a study of the Crusades, of the formation of the French nation, and of the beginnings of absolute monarchy, to the time of the emergence of France into a great European power. Then follows a survey of the Hundred Years' War, of the Protestant Revolution, of the religious civil wars, and finally of the monarchy under Louis XIV. The study of the old regime in France, of the French Revolution, of Napoleon, and of the new nation, brings this course to the point where the course in Modern Europe begins. Text:

Adams's *The Growth of the French Nation*, supplemented by special library assignments, and by lectures on medieval institutions.

126. CURRENT HISTORY. Freshman year, both semesters and summer school. Class work, one hour. One credit each semester. Open as elective for not to exceed a total of four semester credits. Associate Professor Iles and Assistant Professor James.

The content of this course differs each semester from that of any other semester. The text for the course is a good weekly magazine, such as *The Independent* or *The Outlook*. But this is supplemented by such monthly periodicals as *The Review of Reviews* and *World's Work*, together with the daily papers and some library references. The course is so conducted as to give a wide outlook on the world of to-day, and a better understanding of the conditions and institutions in the midst of which we live. It includes a study of as much of the everyday essentials of American and foreign governments, of international relations, of international law, of biography, of industrial developments, and of history—suggested each week by the events of the week—as can be crowded into the one hour of the recitation period. It directs the student to good habits of news reading of the right sort.

127. TEACHERS' COURSE IN HISTORY. Elective, summer school. Class work, two hours. Two semester credits. Associate Professor Iles.

This is a seminar course of discussions based on Henry Johnson's *Teaching of History in Elementary and Secondary Schools*, together with Mace's revised work, *Method in History*, and supplemented by a study of the Report of the Committee of Seven, and of the Committee of Five on *History in the Secondary Schools*, and the Committee of Eight on *History in the Elementary Schools*. A critical examination is made of special books on method in history and civics, such as Wayland's *How to Teach American History*, and of special articles in the *History Teachers' Magazine*. The different texts in history and civics are critically investigated as to points of excellence or weakness, including lectures on the content or viewpoint of each. Information is also given as to the best illustrative material and helps in the teaching of history and civics. This course reveals the evolution in the writing of history, and the growing importance of history and civics in the modern school curriculum, together with the improving viewpoint as to content of both the history and the civic courses.

FOR GRADUATES AND UNDERGRADUATES

202. AMERICAN HISTORY II (*or* WESTWARD EXPANSION AND SECTIONALISM). Elective, both semesters and summer school. Class work, three hours. Three semester credits. Professor Price.

This course concerns itself with the industrial conditions, the issues and the leaders of the middle period of our history, from the close of the War of 1812 to the close of the Civil War. Among the subjects investigated are the industrial and political conditions in America in 1816; the Missouri Compromise; the antislavery agitation; the Webster-Hayne debate; South Carolina nullification; annexation of Louisiana, Florida, and especially Texas; the Mexican War, and the resulting preponderance of the slavery issue; the Compromise of 1850; the Kansas-Nebraska bill and the early Kansas struggle "to the stars through difficulties," including the various constitutions and the final admission to statehood; the origin of the Republican party; the election of 1860; secession; a comparative study of the North and South before, during and after the war; a study of some leading features of the war, including financial questions and foreign relations; reconstruction—political, social, and industrial. Instruction is by means of lectures, recitations, and readings, based on an American History Notebook prepared by the Department.

203. AMERICAN HISTORY III (*or* THE NEW INDUSTRIAL AGE). Elective, second semester and summer school. Class work, three hours. Three semester credits. Professor Price.

This course opens with a review of the industrial conditions in America just before the Civil War; next a careful examination is made of the industrial effects of that war; finally a study of the political and constitutional history of the last half-century is made in the light of the industrial conditions and developments of the same period. Manufactures, commerce, and especially agriculture, are carefully examined, particularly with reference to the South and West. The new developments in political parties and the new devices in self-government are carefully studied as to developments, cause, and present conditions. The new America, with its spirit of nationality, its emphatic self-government, and its new world power and responsibility are studied especially in the light of the new industrial developments. Instruction is imparted by lectures, recitations assigned readings, and special reports.

204. AMERICAN AGRICULTURAL HISTORY. Elective, first semester and summer school. Class work, three hours. Three semester credits. Professor Price.

This course is intended primarily for students in the Division of Agriculture. It devotes itself chiefly to the history of American agriculture. The course starts with a study of European background and Indian beginnings. It traces and compares the agricultural development of New England, the South and the central colonies during the colonial period; then follows the westward movement to the Mississippi valley, with the distinctive American developments in methods, livestock and especially farm machinery. The course gives special consideration to the South with its cotton, to the Northwest with its wheat, to the Southwest with its livestock, and to the corn belt with its varied industries. A special study is made of the last quarter-century, when varied industries, more intensive farming and the high cost of living are replacing extensive mining of the soil, with its remarkable era of low cost of living, its sudden accumulation of wealth, and its rapid development of civilization. The relation of all this to our own State is constantly kept in view. This course should always be supplemented by the course in American Political History. Instruction is given by lectures and recitations, readings and reports.

206. AMERICAN POLITICAL HISTORY. Elective, second semester. Class work, two hours. Two semester credits. This course is especially intended to supplement course 204 or course 105; it is not open for credit to students who have credit in course 202. Associate Professor Iles.

This course gives the story of the origin, development, leaders and functions of political parties in America, and studies the issues and results of the more important presidential elections. It traces the growth of nationality and the development of self-government through American history, but with special reference to present tendencies. A very desirable course for any one who would understand and appreciate present political and governmental conditions and tendencies.

207. PAN-AMERICA. Elective, first semester. Class work, two hours. Two semester credits. Assistant Professor James.

The history, government and industrial conditions of Canada, Mexico and the South American nations, and the interrelations of each of those and the United States are studied in this course.

223. MODERN EUROPE (SINCE 1814). Sophomore year and elective, both semesters and summer school. Class work, three hours. Three semester credits. Associate Professor Iles.

This course traces the evolution of the modern European nations since 1814, with special attention to political organization, industrial develop-

ment, and colonial expansion. Political problems and social and economic adjustments due to the Great War are included. Recitations, lectures and assigned readings. Text: Hayes's *A Political and Social History of Modern Europe*, Vol. II.

224. EUROPEAN INDUSTRIAL HISTORY. Elective, second semester. Class work, three hours. Three semester credits. Assistant Professor Taylor.

This course includes a survey of the industrial and social history of England and the European continent, with some reference to those regions which have been brought into touch with European industrial development. It begins with a view of conditions under the later Roman empire, followed by a study of the medieval manor, the rise of commerce and the towns, the growth of manufactures and the guilds, the development of the middle and laboring classes, the beginnings of modern industry and commerce, and the agricultural and industrial revolution. It closes with a somewhat detailed study of the social and industrial development of modern Europe to the most recent times. Special use is made of such texts as Cheyney's *Industrial and Social History of England*, Day's *History of Commerce*, and Ogg's *Economic and Social History of Europe*, supplemented by lectures and assigned readings.

225. HISTORY OF THE HOME. Elective, second semester. Class work, three hours. Three semester credits. Miss Reynolds.

This course includes the history of the primitive family; the Hebrew family; the family life of the Greeks and of the Romans; and the history of the home and family during the Middle Ages, including the influence of the Christian church. Next the history of the English family in the seventeenth and eighteenth centuries and of the American colonial home are studied. This is followed by a study of the industrial revolution and its effects upon family life. Finally, the history of the family during the nineteenth century, the present situation and tendencies are examined. The course is based primarily on Goodsell's *History of the Family*, supplemented by lectures and special studies.

228. IMMIGRATION AND INTERNATIONAL RELATIONS. Elective, first semester. Class work, two hours. Two semester credits. Professor Price.

The title of the course suggests its content. It includes a study of the causes and the effects—economic, social, and political—of the coming of the foreigner to our shores, including the colonial period, the middle period, and the period since our Civil War, with special reference to the recent changes both as to character of the immigrants and the conditions in America. The text for this part of the course is Fairchild's *Immigration—A World Movement and Its American Significance*. The second part of the course is covered by lectures and assigned readings and reports.

229. THE ANCIENT WORLD. Elective, first semester. Class work, three hours. Three semester credits. Miss Reynolds.

This course is intended primarily for those who expect to teach this subject in the high schools. It includes a study of the ancient world, with special reference to its industries, art, literature, and government. The standard modern texts are used, and the student is familiarized with the best modern literature on the subject.

230. KANSAS HISTORY. Elective, second semester. Class work, two hours. Two semester credits. Assistant Professor Taylor.

This course covers the history of Kansas from the beginning down to the present time, with emphasis on the period of statehood. The conquest of the frontier, the building of the State, and the social, industrial, and political advance to the present day are studied. This is a library course, based on outlines and references prepared by the department.

COURSES IN CIVICS

FOR UNDERGRADUATES

151. AMERICAN GOVERNMENT. Junior year, each semester and summer school. Class work, three hours. Three semester credits. Associate Professor Iles.

This course in civics, or actual government, reviews definitely the fundamental principles and operations of our State and national governments, including the essential principles of constitutional law, but gives special emphasis to the actual present-day conditions and movements in our governmental and political life. Among the subjects especially studied are the initiative and referendum, suffrage and primary elections, the recall, city government and government of territories, the regulation of commerce, conservation of national resources, national defense, taxation and finance, the actual methods of congressional activity, and the function, organization, power, and importance of political parties in our government. The course is primarily based on Beard's *American Government and Politics*. Throughout this course special and definite attention is given to recent and current events in governmental activities.

153. BUSINESS LAW. Junior and senior year, each semester. Class work, one hour. One semester credit; but see Business Law II. Assistant Professor Taylor.

This course includes a careful study of the essential principles in the law of contracts, of sales, and of negotiable instruments. It should be followed by Business Law II. Text: Huffcut's *Elements of Business Law*.

154. BUSINESS LAW II. Elective, each semester. Class work, one hour. One semester credit. Prerequisite: Business Law I. Assistant Professor Taylor.

This course includes a careful study of the more fundamental principles of the law of agency, of insurance, of guarantee and damages; of partnership and corporations; of bailments, including common carriers; of torts, especially the law of negligence; and of patent rights. Text: Huffcut's *Elements of Business Law*, and the *Kansas Statutes*.

155. FARM LAW. Elective, each semester. Class work, two hours. Two semester credits. Assistant Professor Taylor.

This course outlines the following subjects as far as the time permits: *First*. The title to the farm—deeds, etc.; boundaries of the farm—fences, etc.; water rights, including irrigation; police power of the State—quarantine, destruction of diseased animals, pure food; live stock—liability of owner, trespassing animals, estrays. *Second*. Contracts, including hired help, etc.; farm crops and their ownership; renters; sales, including warranty, etc.; factors, or commission merchants; common carriers, such as railroads; insurance. The course is based on Green's *Law for the American Farmer*, supplemented by the *Kansas statutes*.

FOR GRADUATES AND UNDERGRADUATES

252. COMPARATIVE GOVERNMENT. Elective, first semester. Class work, two hours. Two semester credits. Associate Professor Iles.

This course comprises a study of the leading features, especially with regard to administration, of certain European governments such as England, France and Germany, and a comparison of essential features with government in the United States. It is planned to supplement and round out the course in American Government. Text: Macy and Gannaway's *Comparative Free Government* or Holt's *Introduction to the Study of Government*.

256. INTERNATIONAL LAW. Elective, first semester. Class work, two hours. Two semester credits. Assistant Professor Taylor.

.The fundamental principles of international law and international relations, and rights and obligations, public and private, in time of peace and in time of war, are studied, especially in the light of recent developments, such as the Hague conferences. Text: Stockton's *Outlines of International Law*.

Industrial Journalism and Printing

Professor CRAWFORD
Instructor SNOW
Assistant ALLEN
Assistant KEITH

The work in industrial journalism and printing endeavors to accomplish two purposes: the preparation of students who expect to be leaders in industrial, economic and social life to do occasional writing for newspapers and other periodicals on subjects of special interest; the training of students fundamentally interested in journalism for positions on farm journals, newspapers and other publications, particularly where writing on agriculture and other industrial subjects is in demand. The instruction given in the courses considers the requirements of newspapers, agricultural papers, trade publications, and general magazines. The work college. Practical work is done not only on *The Kansas Industrialist*, the official paper of the College, is under the editorial and mechanical direction of the professor of industrial journalism and superintendent of printing. In it is published acceptable matter prepared by students, who write also for newspaper and other publications.

Attention is given to the mechanical side of the profession in the instruction in printing, two semesters of which are required of all students taking the course in industrial journalism. Printing has been taught in the institution continuously since 1875—the longest period during which instruction in the subject has been given in any American college. Practical work is done not only on *The Kansas Industrialist*, but in a wide variety of job printing for College departments.

The equipment for instruction in journalism and printing is that of a practical publishing and printing plant. The journalism work room contains typewriters, reference books, "morgue," and files of a large number of agricultural publications, newspapers, and trade journals.

The printing plant contains one two-revolution cylinder press, one drum-cylinder press, three platen presses, two wire-stitching machines, two paper cutters, a folding machine, an interchangeable perforating and punching machine, a quantity of both display and body type, including some of the most modern faces, and a large amount of miscellaneous equipment. All power machines are driven by individual electric motors.

A large amount of timely agricultural and other information is furnished regularly to Kansas newspapers, farm journals, and other publications. Special assignments are covered for these periodicals, and special inquiries are answered.

COURSES IN INDUSTRIAL JOURNALISM AND PRINTING

FOR UNDERGRADUATES

101. PRINCIPLES OF TYPOGRAPHY I. Freshman year, first semester. Class work, two hours; laboratory practice, three hours. Three semester credits. Mr. Keith.

The course comprises a study of the case, the point system, and the measurement of type and stock. The history of printing is presented and a study is made of the development of the various typographical styles. Practice is given in setting straight matter. Emphasis is laid on accuracy.

104. PRINCIPLES OF TYPOGRAPHY II. Freshman year, second semester. Class work, two hours; laboratory practice, three hours. Three semester credits. Mr. Keith.

The work of the preceding term is continued, a study being made of type faces and the typography of advertisements and head display. The principles of effective make-up are treated. The use of cost systems in printing offices receives extensive attention.

107. ELEMENTARY JOURNALISM. Sophomore year, both semesters. Class work, two hours. Two semester credits. Mr. Snow.

The course is intended to give the student practical experience in the fundamentals of news writing. Methods of obtaining news of various types, the writing of the lead, and the general style of the news story are carefully considered.

113. INDUSTRIAL WRITING. Sophomore year, second semester. Class work, two hours. Two semester credits. Prerequisite: Elementary Journalism. Mr. Snow.

This course applies the principles of journalism to the treatment of industrial subjects, such as are found in agriculture, engineering, home economics, and more general scientific research. The work of the College and the Experiment Station affords the basis for the study and practice.

121. AGRICULTURAL JOURNALISM. Junior year, both semesters. Class work, one hour. One semester credit. Professor Crawford and Mr. Snow.

The course is intended to supply students in the course in agriculture with sufficient knowledge of the principles of news writing, as applied to agriculture, to enable them to become occasional contributors to newspapers and farm journals. Much practice in agricultural writing is given in the course.

123. INDUSTRIAL FEATURE WRITING. Junior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Industrial Writing. Mr. Snow.

The course takes up the feature story, with careful attention to both the informative and the entertaining type. The principles underlying the feature story are applied to writing on agricultural and other industrial subjects. The demands of newspapers, farm journals and general magazines for writing of this character are analyzed.

125. PRINCIPLES OF ADVERTISING. Junior year, second semester. Class work, three hours. Three semester credits. Prerequisite: Industrial Feature Writing. Associate Professor Davis of the Department of English.

The course considers the fundamentals of advertising as a part of modern business. The study of the goods to be advertised, the analysis of the market, the psychology of advertising, the preparation of adver-

tising copy, and other important matters are taken up. The student is required to make application of the principles brought out in the course.

130. TECHNICAL JOURNALISM. Junior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Industrial Feature Writing. Professor Crawford.

The course deals specifically with agricultural journals, trade journals, and other publications of highly specialized character. The writing which is done in the course is done for publications of these types, and the students are required to submit their material to editors. A beginning is made in the study of the desk work required on a technical journal, including the handling of copy, the use of illustrations, and the principles of make-up from the editorial standpoint.

110, 116, 127, 133. JOURNALISM PRACTICE I, II, III, IV. These courses comprise laboratory practice accompanying courses 107, 113, 123, 130. Sophomore and junior years, six hours. Two semester credits for each course. Prerequisite for each semester is the work of all preceding semesters in Journalism Practice. Professor Crawford and Mr. Snow.

The work in Journalism Practice follows closely the other courses in journalism with which it is taken. Students are required to gather news, both assigned and unassigned, and to write the stories in the department workroom. The College campus is divided into "runs," which the students must cover at regular intervals, and assignments are given at specific times. The work given is suited to the advancement of the student. As he progresses in his work he is required not only to obtain news and feature stories, but to edit copy, to read proof, to write heads, to prepare editorials, to select matter worthy of reprint, and to perform other duties required in newspaper and magazine offices. Emphasis is laid on popular treatment of industrial subjects. The instructor in charge gives the students training in looking up references and in handling technical subjects simply but accurately, and also makes specific criticism on the work done by the students.

FOR GRADUATES AND UNDERGRADUATES

201. CIRCULATION AND ADVERTISING PROMOTION. Senior year, first semester. Class work, three hours. Three semester credits. Prerequisite: Technical Journalism. Professor Crawford.

This course deals with the business management of periodical publications. The building up of circulation and the soliciting of advertising receive special emphasis. Premiums and other plans for increasing circulation are discussed. The advertising agency, the circulation analysis, and the fixing of advertising rates are treated.

204. COPY READING. Senior year, first semester. Laboratory practice, six hours. Two semester credits. Prerequisite: Technical Journalism. Professor Crawford.

The course continues the work begun in Technical Journalism and gives practice in the work required of the copy reader, whether on a newspaper, an agricultural journal, or some other publication. A study is made of newspaper style and of magazine and book style, the distinction between the two being clearly pointed out. The writing of heads and titles and proof-reading receive detailed attention. A large amount of copy is actually handled in class, and papers of various types are made up as practice assignments.

207. EDITORIAL PRACTICE. Senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Copy Reading. Professor Crawford.

The course deals not only with the writing of editorials suitable for farm papers, trade papers and newspapers, but with the conduct of the editorial offices of a periodical publication. Students obtain instruction

and practice in writing the matter commonly prepared by the editorial staff of a paper, including editorials, paragraphs, and exchange matter. The acceptance and rejection of contributions receive consideration. Editorial policies and their influence form the subject of careful discussion.

210. ETHICS OF JOURNALISM. Senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Circulation and Advertising Promotion. Professor Crawford.

The course treats the ethics of journalism as exemplified in the use of contributed matter, in the work of the reporter or staff writer, in the editorial conduct of the paper, and in the handling of circulation and advertising. The federal and state laws relating to periodical publications, to advertising, to libel, and to authors' rights, including the federal law of copyright, are treated. The attitude of periodical publications on matters of ethics and law is observed at first hand by the students.

213. MATERIALS OF JOURNALISM. Elective, first semester. Class work, two hours. Two semester credits. Mr. Snow.

This is a course intended primarily for the general student who desires to obtain a knowledge of the principal newspapers and magazines, and to be able to form judgments as to the accuracy and adequacy of news reports and other published matter. The materials handled by the publications, the methods of treatment, and the character of the editorial comment are carefully presented. Attention is given to the several types of journalism.

216. MAGAZINE FEATURES. Elective, second semester, on permission of the instructor. Two semester credits. Mr. Snow.

The course is intended for advanced students who desire to prepare literary work suitable for publication in magazines. The matter of the courses is varied to suit the needs and desires of the students, emphasis being laid upon such types of magazine writing as members of the class wish to practice.

219. HISTORY OF JOURNALISM. Elective, first semester. Class work, two hours. Two semester credits. Professor Crawford.

The course deals with the history of journalism from its beginning, and with the history of printing so far as this is concerned with periodical publications. Most of the time of the course is given to journalism in England, Canada and the United States, though some attention is given to publications of other countries. The differentiation of journalism in the nineteenth century, and the several types which arose because of this are the subjects of careful study. Particular attention is given to the fields of agricultural and trade journalism.

222. JOURNALISM SURVEYS. Elective, second semester. Laboratory work, six hours. Two semester credits. Professor Crawford.

This course comprises the careful investigation of the periodical reading matter of communities. The information obtained is carefully tabulated, and studies are made of the relation of the reading matter to the industrial, economic, social and moral life of the communities.

Library Economy

Librarian SMITH
 Assistant Librarian DERBY
 Reference Assistant DAVIS
 Reference Assistant O'BRIEN

The library supplements the work of every department of the College. It is a storehouse of knowledge for every student. It supplies information and the latest results of scientific research for every instructor. The library is thus essential to the College, forming, as it were, a center from which its various activities radiate.

In order that the library may perform its functions with the highest degree of efficiency it is necessary that instruction be given regarding its use. With this thought in mind a course is offered the purpose of which is to familiarize the student with scientific, up-to-date methods in the use of books and to acquaint him with the best general reference books as well as with standard works on various subjects. Placed at the beginning of his College course it should tend to increase largely his efficiency in study throughout the entire course.

COURSES IN LIBRARY ECONOMY

FOR UNDERGRADUATES

101. LIBRARY METHODS. Freshman year, both semesters. Class work, one hour. One semester credit. Assistant Librarian Derby, Miss Davis, and Miss O'Brien.

The course consists of lectures on classification and arrangement of books in the library; card catalogues; the principal works of reference, such as dictionaries, encyclopedias, atlases, and standard works in history, literature, economics, quotations, statistics, etc.; public documents and their indexes; indexes to periodicals, etc. Instruction is given also in methods of indexing current reading for purposes of future reference.

Mathematics

Professor REMICK
 Associate Professor ANDREWS
 Associate Professor WHITE
 Assistant Professor PORTER

Assistant Professor STRATTON
 Instructor ZEININGER
 Instructor FEHN
 Instructor HOLROYD

In an institution that stands as an exponent of the industrial type of education, mathematics should occupy an important place. Training in the exact science is valuable not only for its own sake but also on account of its manifold application. On this basis the courses in mathematics are offered primarily with the following ends in view: (1) the attainment of mental power and accuracy in the interest both of general culture and special application; (2) the acquirement of facts and processes that will provide the student with an indispensable tool for further scientific and technical study.

Freshman courses are offered each term, sophomore courses at least twice during the year.

COURSES IN MATHEMATICS

FOR UNDERGRADUATES

101. PLANE TRIGONOMETRY. Freshman year, first and second semesters. Class work, three hours. Three semester credits. Prerequisites: Plane geometry and one and one-half years of high-school algebra. Professor Remick, Associate Professor White, Assistant Professors Porter and Stratton, and Mr. Fehn.

This course treats of the functions of acute angles, right triangles, goniometry, oblique triangles, practical problems. Text: Palmer and Leigh's *Plane and Spherical Trigonometry*.

104. COLLEGE ALGEBRA. Freshman year, first semester. Class work, three hours. Three semester credits. Prerequisites: Plane geometry and one and one-half years of high-school algebra. Professor Remick, Associate Professor Andrews, Assistant Professors Porter and Stratton, and Mr. Fehn.

Elementary topics, functions and their graphs, quadratic equations are rapidly reviewed. The further treatment includes the subjects of complex number, theory of equations, permutations and combinations, partial fractions, logarithms, and determinants. Text: Hawke's *Higher Algebra*.

107. COLLEGE ALGEBRA (a). Freshman year, first semester. Class work, five hours. Five semester credits. Prerequisites: Plane geometry and one year of high-school algebra. Professor Remick, Associate Professor Andrews, Assistant Professors Porter and Stratton, and Mr. Fehn.

After a brief review of elementary subjects, a thorough treatment of quadratics, ratio, proportion, progressions, and the binomial theorem for positive exponents is given. The remainder of the course follows closely the chief content of course 104.

110. PLANE ANALYTICAL GEOMETRY. Freshman year, second semester. Class work, four hours. Four semester credits. Prerequisites: Plane Trigonometry and College Algebra. Associate Professors Andrews and White, Assistant Professors Porter and Stratton.

This course treats of coördinate systems, projections, loci, straight line, conics, parametric and empirical equations, with a discussion of the general equation of the second degree. A set of notes prepared in the department is used as a basis of the course.

113. CALCULUS I. Sophomore year, first semester. Class work, five hours. Five semester credits. Prerequisite: Plane Analytical Geometry. Professor Remick, Associate Professors Andrews and White and Assistant Professor Porter.

The usual topics of differential calculus will be considered together with integration of standard forms, definite integrals, rational fractions, and integration by parts. This course contains problems closely related to the work of engineering students. Text: Grainville's *Differential and Integral Calculus*.

116. CALCULUS II. Sophomore year, second semester. Class work, three hours. Three semester credits. Prerequisite: Calculus I. Professor Remick, Associate Professors Andrews and White, and Assistant Professor Porter.

In this division of the subject emphasis is laid upon the applied side. Problems involving areas, lengths, surfaces, and volumes are treated by processes of single integration. The idea of successive and partial integration is applied to areas, moments, centers of gravity, surfaces, volumes, etc. The types of differential equations which the student of engineering is most likely to meet with in his subsequent work are briefly discussed. Text: Granville's *Differential and Integral Calculus*.

119. **CALCULUS.** Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Analytical Geometry. Professor Remick and Associate Professor Andrews.

This course is designed especially for students intending to teach secondary mathematics. It includes a brief treatment of the fundamental principles of both branches of the calculus, practice with the standard formulas of differentiation and their application to geometry and mechanics. Integration of the usual elementary forms is followed by the idea of the definite integral and a few of the more important applications.

122. **TEACHER'S COURSE IN MATHEMATICS.** Elective, second semester. Class work three hours. Three semester credits. Associate Professor Andrews and Assistant Professor Stratton.

As its name indicates, this course is intended primarily for those who are planning to teach elementary mathematics. Emphasis is given to pedagogical questions, with some reference to the historical course of development. A discussion of the best methods of teaching arithmetic, algebra, and geometry; a study of the report of prominent mathematical organizations, especially those of the international commission; a comparison of the curricula of different schools—these are some of the matters which receive attention. An examination is made of books and articles on the teaching of mathematics. The course proceeds by lectures, readings, and reports on assigned topics.

125. **ANALYSIS OF STATISTICS.** Elective, first semester. Class work, three hours. Three semester credits. Professor Remick and Assistant Professor Porter.

The special purpose of this course is to acquaint students of agriculture, who may have occasion to make use of statistical tables of various sorts, with the modern mathematical methods of treatment. Use is made of farm bulletins, agricultural reports, etc., by means of lectures, reading, and recitations.

128. **MATHEMATICS OF BIOLOGY.** Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Analytical Geometry. Professor Remick.

Elements of differential and integral calculus, curve plotting, and determination of equations of curves, are here considered. The course is designed to meet the needs of students in biology and is taught largely by the lecture method.

131. **INSTITUTIONAL ACCOUNTING.** Elective, second semester. Class work, three hours. Three semester credits. Assistant Professor Stratton.

This course treats of accounting for institutions such as colleges, schools, clubs, societies, industrial and social organizations. The practice work includes preparation for publication of statements of income and expenditure, balance sheets, treasurer's reports, financial data and statistics, and of the annual returns of net income required under the federal income-tax law. A study is made of the mathematics of investments, the handling of endowment and trust funds, and the preparation of budgets. The work proceeds by lectures, discussions, written reports, and exercises.

134. **ACCOUNTING PRACTICE.** Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Elementary bookkeeping. Assistant Professor Porter.

The course includes an analysis of the development and structure of bookkeeping methods, the accounts of single proprietors, partnerships and corporations, the construction of manufacturing and trading profit-and-loss accounts and balance sheets, the analysis of railroad reports and

bank statements, including bankruptcy and receivership conditions. The course is designed to give the students power to analyze commercial accounts and statements.

FOR GRADUATES AND UNDERGRADUATES

201. DIFFERENTIAL EQUATIONS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Calculus II. Professor Remick.

This course is designed for those who may wish to extend their study of mathematics beyond the usual first course in calculus, and also for those intending to take advanced work in physics, mechanics, or engineering. The various standard types of differential equations are considered together with the usual applications. Text: Murray's *Differential Equations*.

204. METHOD OF LEAST SQUARES AND THEORY OF MEASUREMENT. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Calculus II. Associate Professor Andrews.

The course includes a study of the law of error based on the theory of probability and the probability curve. Adjustments of observations by the method of least squares. Development of precision measures. Distribution of errors, Gauss's method of substitution in the solution of normal equations. The solution of a number of problems will be required.

207. SOLID ANALYTICAL GEOMETRY. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: Plane Analytical Geometry and Calculus II. Associate Professor White.

The topics treated include coördinates of points in space and their transformations, and involve the usual discussion of lines and planes. The standard types of quadric surfaces are considered together with their classification and principal properties. Text: Snyder and Sisam's *Analytical Geometry of Space*.

FOR GRADUATES

In addition to the preceding courses, more advanced work in mathematics is offered for candidates for the master's degree. Courses are available in the following subjects: 301, Advanced Calculus; 306, Theory of Equations; 311, Theory of Functions of a Complex Variable; 316, Modern Analytical Geometry; and 321, Theoretical Mechanics.

Military Training

Captain L. O. MATHEWS (U. S. A.), Professor of Military Science and Tactics
Commissary Sergeant CLAEREN (U. S. A., retired), Assistant
B. H. OZMENT, Band Leader

Since this College is one of the beneficiaries of the act of Congress of 1862, military tactics is required in the College curriculum. All young men under twenty-five years of age are required to take military science three full hours a week for two years. A student entering as a junior or above is held for Military Science for the time necessary to complete the remainder of his College course unless this period is reduced by credits accepted from another institution.

Requests for excuse from military science, or for postponement of the work, are acted upon by the President of the College. Such requests are presented through the student's dean, and the President obtains the

advice of the commandant of cadets, who thoroughly investigates each case on its merits and makes his recommendation to the President. Requests based on physical condition must be accompanied by a recommendation made by the College physician. Students excused from military science on account of physical disability or age are assigned to an equivalent amount of some other College work instead. Students permitted to postpone military science for any reason are not thereby excused but must make it up later, even though they have in the meantime reached the age of twenty-five years.

Additional work in military science may be elected by students who have completed the required work, and these are given preference for appointment as cadet officers and noncommissioned officers. A senior or junior, having enrolled optionally and accepted a commission or warrant, is required to continue the work throughout the College year subject to the same regulations as other cadets. One semester credit of elective work toward graduation is allowed for each term of military science taken beyond that required.

Students under military instruction are organized into a battalion or a regiment of infantry, a machine-gun platoon, a company of engineers, and a company of signal corps, the organization, drill, and administration of which conform to that of the army.

Since the number of students assigned to military drill is sufficient to maintain a regimental organization, a band is also provided, the members of which must be thoroughly trained in military science. Assignments to the band are made upon request of the band leader, who is charged with the technical instruction.

Officers and noncommissioned officers are selected by the professor of military science and tactics, with the approval of the President. This selection is made from among those cadets who have been the most studious and soldierlike in the performance of their duties, and the most exemplary in their general deportment. Commissions are given all officers, and these commissions are signed by the governor, the secretary of state, and the adjutant-general of Kansas National Guard, while warrants signed by the President of the College and the commandant of cadets are issued to the noncommissioned officers. Both are held during the good conduct of the recipient.

The degree of excellence attained in military drill by the corps of cadets is limited wholly by the state of discipline existing in the corps. Therefore, military discipline, as far as compatible with College regulations, is rigidly enforced during the hour allotted to military work; and it is impressed further upon all cadets that their actions and behavior at times other than the hour for military drill should be regulated by the standards of honor and duty inculcated in military discipline. Each cadet is furnished with a copy of the Regulations of the Corps of Cadets, Kansas State Agricultural College, and is expected to conform to the rules and the requirements of the same.

The Department of Military Science, having during the past three years attained such a degree of proficiency as to be classified as a "distinguished college" by the War Department, we are privileged to recom-

mend for appointment a number of second lieutenants in the United States army from the graduating class. The appointees are men having the highest scholarship and military attainments.

At the close of the year the names of the cadets most distinguished in military science and tactics are reported to the War Department, and also to the adjutant general of the State of Kansas.

To the cadets completing the full course in military science and tactics many excellent opportunities are offered. These young men are well prepared to stand examinations for commissions in the regular service or in the Philippine constabulary, and their training at this institution makes of them efficient subalterns. In addition to such positions, opportunities exist for affiliation with the National Guard of the State.

The College is equipped with a modern target range, complete in every detail, and an indoor gallery range. A College rifle club, with the initiation fee fixed at \$1, has been organized by the cadets. To this club, organized for the purpose of promoting rifle practice, all cadets are eligible. Matches are held each week with the leading colleges and universities throughout the United States.

COURSES IN MILITARY SCIENCE AND TACTICS

101. MILITARY SCIENCE I. Freshman year, first semester. Lectures, recitations, and military drill, three hours. One semester credit. Prerequisite: None.

102. MILITARY SCIENCE II. Freshman year, second semester. Lectures, recitations, and military drill, three hours. One semester credit. Prerequisite: Military Science I.

103. MILITARY SCIENCE III. Sophomore year, first semester. Lectures, recitations, and military drill, three hours. One semester credit. Prerequisite: Military Science II.

104. MILITARY SCIENCE IV. Sophomore year, second semester. Lectures, recitations, and military drill, three hours. One semester credit. Prerequisite: Military Science III.

Modern Languages

Professor CORTELYOU
Instructor LIMPER
Assistant _____
Graduate Assistant PARK *

The study of modern foreign languages serves a number of purposes. It gives the student general training and culture; it throws helpful side lights upon English, his mother tongue, and it gives him important aid in scientific research. It is desired that the instruction in German and French here given be as practical as possible, without, however, failing to encourage an appreciation of modern foreign literature. The plan of instruction in general is a combination of the grammatical and conversational methods, each of which has its own special advantages.

* For the year 1916-'17.

A number of literary and scientific periodicals published in German and French are received by the College library, and afford the student an excellent opportunity to amplify his reading knowledge of these languages. Participation in the semimonthly meetings of the Deutscher Verein, open to students who have had a year of German or more, gives ample opportunity for developing the student's ability to speak the language and to understand it when he hears it.

Students who have had German or French in the high school are required, as a rule, to take more advanced courses as their elective or required work in foreign languages here.

COURSES IN GERMAN

FOR UNDERGRADUATES

101. GERMAN I. Sophomore year, first semester. Class work, three hours. Three semester credits. Professor Cortelyou, Mr. Limper, and Mrs. Park.

After two periods given to the acquisition of the sounds of the German letters, the student at once begins reading. Vocabularies are learned from the outset, while grammar is acquired gradually through reading. Oral and written work and simple conversational exercises begin with the first reading lesson. In the work of this term there is included the study of articles, declensions of nouns and pronouns, the indicative mode of weak verbs, sentence order, and the comparison of adjectives. Frequent reviews enable the student to digest the facts presented, while the abundant conversation and written work subserves the same end. Text: Vos's *Essentials of German* (first eighteen lessons).

106. GERMAN II. Sophomore year, both semesters, and summer school. Class work, three hours. Three semester credits. Prerequisite: German I. Professor Cortelyou, Mr. Limper, and Mrs. Park.

The remaining important points of grammar are studied. Students are repeatedly drilled on the grammatical constructions already emphasized in Elementary German I. The general plan of the work is the same as in the preceding term. Essential facts of grammar are insisted upon, but German is taught as a living language. Conversational exercises in German and written translation from English into German are frequent. Text: Vos's *Essentials of German* (completed).

111. GERMAN READINGS. Junior year, both semesters, and summer school. Class work, three hours. Three semester credits. Prerequisite: German II. Professor Cortelyou, Mr. Limper, and Mrs. Park.

This course embraces readings of dialogue selections which deal in detail with German life, customs, history, and mythology. A few of the best and most popular song poems also are studied. Grammatical drill is continued, with occasional sight readings and translations into German. Conversations are based on the readings. Text: Bacon's *Im Vaterland*.

FOR GRADUATES AND UNDERGRADUATES

201. GERMAN SHORT STORIES. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: German Readings. Given in the year 1917-'18 and alternate years thereafter. Professor Cortelyou and Mr. Limper.

The material read in this course comprises a number of short stories of considerable interest by such modern authors as Auerbach, Niese, Goldhammer, von La Roche, von Leander, von Scheffel, and von Polenz. Text: Baker's *German Stories*.

206. GERMAN COMEDIES. Elective, both semesters. Class work, three semester credits. Prerequisite: German Readings. Given in the year 1916-'17 and alternate years thereafter. Professor Cortelyou and Mr. Limper.

The course comprises the reading of recent one-act comedies of literary merit, and of a realistic, lively and cleanly humorous nature, including the following: Julius Rosen's *Ein Knopf*, Gustav von Moser's *Ein amerikanisches Duell*, Hugo Mueller's *Im Wartesalon erster Klasse*, and Emil Pohl's *Die Schulreiterin*. Exercises in conversation and sight reading are occasionally introduced. Text, Manley and Allen's *Four German Comedies*.

216. GERMAN HISTORICAL PROSE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Course 201 or 206. Given in the year 1917-'18 and alternate years thereafter. Professor Cortelyou.

In this course an insight is obtained of the Prussian government, administration of justice, military system, economic development, and strivings toward national unity as they existed at the time of Frederick the Great. Text: Rogge's *Der grosse Preussenkoenig*, edited by Adams.

221. GERMAN PROSE I. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Course 201 or 206. Given in the year 1916-'17 and alternate years thereafter. Professor Cortelyou.

This is a practical course designed to give the student an intimate knowledge of everyday German as used among the Germans in their varied activities. The following are studied in this course: visits; the various stores; restaurants, meals, and expressions used at table; boarding houses and hotels; the family, weddings, marriages, etc.; dress; the school system; religion and church life; divisions of society, occupations; money, measures, and weights; festivities; traveling; the postal system, the telegraph, the telephone; the city in general; Berlin and cities of the provinces; the country; the German empire; the military system; conversational phrases; the best German; everyday German. There are occasional sight translations, and some conversational work is done. Text: Kron's *German Daily Life*.

226. GERMAN CLASSICS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Course 216, 221, or 231. Given in the year 1917-'18 and alternate years thereafter. Professor Cortelyou and Mr. Limper.

This is a course introductory to a study of the German classics. Two or three of the simpler works of classic authors, such as Lessing's *Minna von Barnhelm* and Goethe's *Hermann und Dorothea*, are translated in the work of this term. Textbooks: Lessing's *Minna von Barnhelm*, edited by von Minckwitz and Wilder, and Goethe's *Hermann und Dorothea*, edited by Allen.

231. GERMAN PROSE II. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Course 201 or 206. Given in the year 1916-'17 and alternate years thereafter. Professor Cortelyou and Mr. Limper.

This course is designed to give the student facility in the rapid translation of fairly easy prose. A number of modern short stories are read. Besides the more formal work, there are sight translations of easy selections. Text: Allen and Batt's *Easy German Stories*, Vols. I and II.

236. SCIENTIFIC GERMAN I. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Course 201 or 206. Professor Cortelyou.

This course is designed as an introduction to the vast field of scientific publications appearing in German. It consists chiefly in translating

miscellaneous scientific articles, especially those dealing with chemistry and physics. Text: Dippold's *Scientific German Reader*.

241. SCIENTIFIC GERMAN II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Course 236. Professor Cortelyou.

This is a continuation of the preceding course. The material studied is of a more general nature than in course 236. Text: Greenfield's *Technical and Scientific German*.

246. TEACHERS' GERMAN. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Five or more courses in College German, or the equivalent. Mr. Limper.

In this course a rapid but thorough review of the grammar is given, and composition work is carried on in connection with it. Conversation also occupies part of the class period. Several recitations are devoted to the theory of phonetics, particularly as applied to German. Text: Bierwirth's *Elements of German*, and supplementary matter furnished by the department.

COURSES IN FRENCH

FOR UNDERGRADUATES

151. FRENCH I. Sophomore year, first semester. Class work, three hours. Three semester credits. Mr. Limper or Miss _____.

The phonetic symbols being a great help in the acquisition of accurate pronunciation, the first two days are devoted to learning these symbols and a number of useful expressions in French. The recitations are conducted largely in French and considerable time is devoted to conversation. Nevertheless, conversation is considered merely a means to the acquisition of a reading knowledge of French. The fundamentals of grammar are covered in this semester and reading matter in the grammar is supplemented by a reader. Text: Olmsted's *Elementary French Grammar* (first twenty-two lessons) and Allen and Schoell's *French Life* (thirty pages).

156. FRENCH II. Sophomore year, second semester. Class work, three hours. Three semester credits. Prerequisite: French I. Mr. Limper or Miss _____.

This course is a continuation of French I. The grammar is completed, special attention being given to irregular verbs. Reading and conversation are continued throughout the course. Students who have had one year of French in high school begin with this course. Texts: Olmsted's *Elementary French Grammar* (Lesson XXII to the end) and Allen and Schoell's *French Life*.

161. FRENCH READING. Junior year, first semester. Class work, three hours. Three semester credits. Prerequisite: French II. Mr. Limper or Miss _____.

This is essentially a reading course, the purpose being to enlarge the student's vocabulary. Grammar is reviewed and considerable time is devoted to conversation. Fontaine's *En France* and one other short French text are read.

FOR GRADUATES AND UNDERGRADUATES

251. FRENCH SHORT STORIES. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: French Readings. Mr. Limper or Miss _____.

The purpose of this course is to introduce the student to modern French literature. The modern short story, since it covers so large a range of subjects, also offers excellent material for the enlargement of the vocabulary. Stories by such writers as Daudet, Maupassant and Zola are read.

Music

Professor WESBROOK
Assistant Professor BROWN
Instructor CARLEY

Assistant EASTER *
Assistant ABERNATHY
Band Leader OZMENT

The aim of the Department of Music is to become of vital value in the life of every student. The department strives to create and foster a love and appreciation for the best in music and to give to students that broader culture and more complete education which is gained through academic and professional and vocational training combined with musical and artistic study. Believing that this can be accomplished to a much greater degree by having artistic performers among us, courses are offered which will prepare those who so desire to be efficient in some chosen musical line. Students enrolled in the department participate in the musical contributions to the public programs of the College, and such participation is a part of their training and duty.

METHODS OF INSTRUCTION

Instruction in voice and instrumental music is taught in private lessons. Each teacher in the Department of Music, however, reserves a certain number of hours of his time for class work in these subjects, taking four or more in a class for a period of one hour a week, so that those not having time for the private work may enroll in these classes and by emulation and observation, and, with what little individual attention the student may receive in so short a time, will get a general view and insight into the work undertaken. However, no two students have the same mental, physical or artistic capacity, and their individual capabilities can be neither properly nor fully developed without painstaking personal attention. The best results are dependent on a close adaptation to the individual needs of the pupils, and this, of course, can not be gained in classes, as is the case in the individual lessons. The effectiveness of the methods used is demonstrated by the interest and progress of the pupils. No College credit is given for class instruction in voice or instrumental music except as otherwise definitely stated.

All theoretical work is taught in classes. These and other classes in the Department of Music are free to any student in the institution.

CREDITS

Students taking work in the Department of Music are allowed credits on their work in the Divisions of General Science, Home Economics, and Agriculture, while substitutions in music, with the approval of the Dean, may be made in the Division of Mechanic Arts, as follows: For Voice or some instrument, two hours each semester; for Musical History, one hour each semester; for Harmony, two hours each semester; for Counterpoint, Musical Form and Musical Analysis, two hours each semester; for Chorus, Orchestra or Band, one hour each semester; for Public School Music Methods, two hours each semester. Young women electing

* Resigned.

music instead of the second year of physical training will be given a course consisting of choral work Monday evening of each week and one lesson a week in Musical Appreciation.

Students coming from other schools to take up our course in applied music may be sufficiently advanced as players or singers to enter the second or third year of the regular course but prohibited therefrom owing to their lack of theoretical knowledge. If such students enter the first year of the theoretical course, their progress as players and singers is not retarded, but it would be much to their advantage to make special theoretical preparation in the hope of qualifying for more advanced standing.

CURRICULUM IN ADVANCED MUSIC

By applied music is meant the practical and scientific study of voice, piano, violin, violoncello, organ, or some band instrument, in private individual lessons, together with the study of theoretical subjects in classes. The course is designed to fit students not only to be artistic soloists, but also to be efficient teachers of their chosen instrument.

In addition to the requirements outlined below, a high-school education or its equivalent is necessary for a certificate. As to the length of time it takes to complete this course satisfactorily, much depends upon the natural ability of the pupil, the intensity of his application, and the time he spends in developing the art of his particular instrument. Each candidate for a certificate must give a public recital some time during the spring term of his third year.

During the last semester in this course a teacher-training class in each department is conducted, and this practice teaching, under the supervision of the instructor, together with the training already acquired, gives to the student the fundamentals for successful teaching.

OUTLINE OF CURRICULUM IN APPLIED MUSIC

FIRST YEAR

FIRST SEMESTER:

Voice or some instrument. Two private lessons a week.
Harmony I. Two one-hour recitations a week.
Musical Appreciation I. One one-hour recitation a week.
Ensemble. Choral society, orchestra, band or glee club.
German I. Three one-hour recitations a week.

SECOND SEMESTER:

Voice or some instrument. Two private lessons a week.
Harmony II. Two one-hour recitations a week.
Musical Appreciation II. One one-hour recitation a week.
Ensemble. Choral society, orchestra, band or glee club.
German II. Three one-hour recitations a week.

SECOND YEAR

FIRST SEMESTER:

Voice or some instrument. Two private lessons a week.
Harmony III. Two one-hour recitations a week.
Ensemble. Choral society, orchestra, band or glee club.
Musical History I. One one-hour recitation a week.
Ear Training. One one-hour recitation a week.
English I (Music). Three one-hour recitations a week.
Recital.

SECOND SEMESTER:

Voice or some instrument. Two private lessons a week.
 Harmony IV. Two one-hour recitations a week.
 Ensemble. Choral society, orchestra, band or glee club.
 Musical History II. One one-hour recitation a week.
 Ear Training. One one-hour recitation a week.
 English II (Music). Three one-hour recitations a week.
 Recital.

THIRD YEAR

FIRST SEMESTER:

Voice or some instrument. Two private lessons a week.
 Counterpoint. Two one-hour recitations a week.
 Ensemble. Choral society, orchestra, band or glee club.
 Psychology. Three one-hour recitations a week.
 Recital.

SECOND SEMESTER:

Voice or some instrument. Two private lessons a week.
 Musical Form and Analysis. Two one-hour recitations a week.
 Ensemble. Choral society, orchestra, band or glee club.
 Educational Psychology. Three one-hour recitations a week.
 Recital.
 Practice Teaching.

Upon the approval of the Dean of the Division of General Science and the Director of the Department of Music, substitutes in collegiate subjects such as German, English, etc., as outlined above, may be made, these substitutes to be made in literary lines.

A certificate is awarded to students who complete the course in music as outlined in the foregoing statement.

THEORETICAL COURSES IN MUSIC

The aim of theoretical courses is primarily to give the student an intelligent conception of music as a science, and give him such working knowledge of the material of music as will fit him for intelligent appreciation, criticism and interpretation; and secondarily, to form a broad foundation for later study in composition.

101, 102. HARMONY I AND II. Elective, beginning first semester and continuing throughout the year. Class work, two hours. Two semester credits.

This course consists of a study of the following: Scales and intervals; primary and secondary triads and their inversions; harmonizing of given basses and melodies; chords of the dominant seventh; secondary seventh chords; modulation; original work begun; ear training; key-board harmony.

103, 104. HARMONY III AND IV. Elective, beginning first semester and continuing throughout the year. Class work, two hours. Two semester credits. Prerequisite: Harmony II.

This course includes a study of the following: Modulations, continued; altered chords; suspensions; foreign tones; pedal points; figuration; accompaniments; original work; ear training; elementary harmonic analysis; elementary analysis of form.

107. COUNTERPOINT. Elective first semester. Class work, two hours. Two semester credits. Prerequisite: Harmony IV.

The course in counterpoint consists of the study of simple counterpoint in two parts; first, second, third, fourth and fifth species, and florid counterpoint.

109. **MUSICAL FORM AND MUSICAL ANALYSIS.** Elective, second semester. Class work, two hours. Two semester credits. Prerequisites: Harmony IV and Counterpoint.

Chord reading and the accounting theoretically for every note in a piece of music, combined with analytical study of hymn tunes, preludes, inventions, and dance forms of Bach, small instrumental forms, song forms, sonata forms, cantata and oratorio forms.

110, 111. **MUSICAL HISTORY I, II.** Elective, beginning first semester and continuing throughout the year. Students may enter at the beginning of either semester, however. Class work, one hour. One credit each semester.

A modern text forming the basis of this work is supplemented by lectures and library research. Time is given to the early and primitive development of the art, but special stress is laid upon the classical, Roman and modern periods, together with the present-day conditions and tendencies. In addition to theses upon the general historical and critical subjects, the class is also given practice in journalistic criticism of concert and recital performances.

115, 116. **MUSICAL APPRECIATION I, II.** Elective. Class work, one hour. Lectures. Students may enroll at the beginning of either semester.

Music is a language and like language must be learned by hearing. As it is the sole design of this course to facilitate intelligent listening, the student's powers of imagination and observation are appealed to at once.

The work is presented in a nontechnical way in the form of illustration from a talking machine. The subjects treated are melody, rhythm, form, cadence, classical and romantic ideals, present-day tendencies, songs, piano, violin, orchestra, band, chorus, opera, etc., and differences in concert and recital programs.

Several different hours are devoted to this work so that many students may be accommodated at periods which will suit their convenience.

120, 121. **SCHOOL MUSIC METHODS I AND II.** First semester and continuing throughout the year. Lectures and research, three hours. Two semester credits for each course.

These courses deal with the place of music and the teacher in the school and in the community.

122, 123. **SCHOOL MUSIC METHODS III AND IV.** First and second semesters, respectively. Lectures, research, and practice teaching, three hours. Two semester credits for each course.

These courses are a continuation of School Music Methods I and II.

PRACTICAL COURSES IN MUSIC

130. **VOICE.** Two private lessons a week. Two semester credits. Elective in College courses.

The course of instruction is based primarily upon the Italian school for training voices. Correct tone placement, so that the pupil produces tones throughout all registers with ease, and with firm, even quality, is the foundation of good singing. During the first year especial attention is given to a systematic course in breathing, tone placement and analysis of vowels and consonants relative to vocal needs. At all times attention is given to perfect enunciation, and German, French and Italian diction is taught in connection with actual song coaching. The song literature of America, England, Germany, France and Italy is studied and a satisfactory performance of songs, oratorio or operatic arias from each one of these schools is necessary. Students specializing in voice in this course are expected to be or become able to play simple accompaniments.

135. VIOLIN. Two private lessons a week. Two semester credits. Elective in College courses.

In this department the aim is to teach the fundamentals of violin playing in such a manner as to lay the foundation of intelligent musicianship. In this work as in the other lines of musical endeavor, mastery of the instrument is a task which imposes different difficulties upon every student. Natural ability, physical characteristics and the general make-up of the individual so influenced progress that no definite method of instruction can be outlined which can be profitably pursued by all players. However, particular attention is paid to the correct position of the student while playing and also the manner of holding the violin and bow. A graceful and natural method of playing is insisted upon and great care is exercised to develop an accurate feeling for good intonation. Elementary scale work is begun at an early period and is gradually extended. Studies and exercises from the best writers are selected and, as the student develops, the entire field of violin literature is open for study.

Violoncello, viola and contrabass receive the same attention in this department as does the violin.

140. PIANO. Two private lessons a week. Two semester credits. Elective in College courses.

The methods of instruction in this department are direct and simple. Pupils are taught not only to play, but also to think logically according to the scientific principles of the art. Thus is developed definite and intelligent teaching ability as well as sound artistic performance. A technical foundation is the first requisite in modern piano playing. This is accomplished by a carefully selected and graded set of exercises and studies designed to bring about that mental control of muscles, without which artistic results can not be obtained. Clearness of conception, distinctness of phrasing, variety of tone, good rhythm and technical accuracy are insisted upon. As the student advances, difficult compositions of both the classic and modern writers are studied. Interpretation becomes a special study and all the emotional, intellectual and physical faculties are brought into that harmony and control which alone results in artistic performance. Opportunity is offered for study of accompaniments and piano ensemble.

145. WIND INSTRUMENTS. Two private lessons a week. Two credits. Elective in College courses.

In this department opportunity is offered for the study of any wind instrument. Both the Albert and Boehm systems of clarinet playing are taught, while the semi-no-pressure system of cornet playing is used. In this as in other departments the work is taught beginning with elementary scale and technical study and extending over the more difficult literature written for wind instruments. Instruction in instrumentation, conducting and formation of bands is also given.

MUSICAL ORGANIZATIONS

Every voice and each instrument has a distinct function in the science of tonal expression and only in the combination of voices and instruments are the finest effects in the coloring of melody, harmony and rhythm produced. This combination is made possible in the Department of Music by the number of students enrolled in the College and by the variety of ensemble organizations.

150. THE CHORAL SOCIETY. Throughout the year. Weekly rehearsals, all special rehearsals and public performances. One credit each semester.

This organization, which is conducted by Professor Wesbrook, numbers about three hundred and is one of the largest student singing organiza-

tions in America. The rehearsals are held Monday evening, weekly, and part songs, madrigals, glees, cantatas, and the great oratorios are studied and presented publicly with the assistance of the orchestra and visiting artist soloists.

151. THE ORCHESTRA. Regular rehearsals, all special rehearsals and public performances. One credit each semester.

The orchestra is conducted by Assistant Professor Brown, teacher of stringed instruments. It is a definite organization wherein discipline prevails and permanent membership with regular attendance is insisted upon. This body maintains a correct and well-balanced instrumentation, containing all the instruments of the modern symphony orchestra. The work is highly educational and offers in the preparation for concerts and performances with the choral society the actual experience and routine necessary for efficient orchestra playing. Membership is open to all in the College who are capable of playing acceptably.

152. THE MILITARY BAND. Regular rehearsals, special rehearsals and public performances. One credit each semester.

The band is a part of the cadet corps and practice in the band is accredited through the Department of Military Science in lieu of drill and theoretical instruction. Members of the band are required to conform strictly to the cadet regulations. The band furnishes music for all ceremonies of a military character and for various other College occasions.

THE APOLLO CLUB. The Apollo Club consists of about thirty of the best men's voices in the Institution. The try-out for this singing body is held in the fall term of each year and the club is chosen from a large number seeking admission. A "waiting list" is maintained, and a place made vacant in the club by a member who drops out is immediately filled by one of this list. Credit is given through the Choral Society.

The singing of the Apollo Club is characterized by striking vigor, spontaneity, clear enunciation, shading and color, all of which are vital elements in artistic singing. This organization is available for a limited number of concert engagements and recitals throughout the State.

THE ST. CECILIA CLUB. This is a singing organization of young women and is without doubt one of the finest organizations of its kind in the West. The voices are selected with the utmost care as to range, blending qualities and special adaptability to the work, thus securing an almost perfect ensemble. The St. Cecilia and Apollo clubs are combined for special choir singing. Credit is given through the Choral Society.

RECITALS AND CONCERTS

Unusual advantages for hearing good music are afforded at this institution. In addition to numerous choral, orchestra, band and glee-club concerts given, in which the leading soloists of the country are heard assisting, a number of great artists are brought to our College by the College lyceum-course committee. Recitals by the members of the conservatory faculty and by students are numerous.

FEEES

33 half-hour lessons with director	\$33.00
33 half-hour lessons with other teachers	22.00
16 half-hour lessons with director	18.00
16 half-hour lessons with other teachers	12.00

Physical Education and Athletics

Professor CLEVENGER
Assistant Professor SCHULZ
Assistant Professor BAUER
Assistant Professor CAHOON
Assistant LORING

The purpose of this department is to assist the students of the College to live to the best advantage, and so to aid them in the formation of hygienic habits that during their College course they may make profitable physical preparation for life. It is an urgent necessity that each student have an intelligent appreciation of the means requisite for the preservation of his health, in order that he may be able to formulate intelligently his own policy of health control.

All young men and all young women of the College are entitled to the privileges of the gymnasium, which is one of the largest in the West and is well equipped with all sorts of apparatus for physical training, with lockers, plunge baths, shower baths, and other accommodations.

PHYSICAL TRAINING FOR MEN

Physical training is optional for College men, but may be elected. Three days a week for the semester is considered full time, and for this one hour of credit is given. A total of four hours of credit may be elected.

PHYSICAL EXAMINATIONS

The work of the department is based largely upon a physical examination given each student upon his first entrance to the department. A second examination is given at the close of his sophomore year. All students, whether taking work in the department or not, are entitled to receive a physical examination, and advice as to their physical condition.

The measurements taken and the tests given have each a definite purpose with reference to ascertaining the muscular condition of the individual. A diagnosis is also made of the vital organs to ascertain their functional conditions, and a complete inspection of the whole body is made to detect any weakness or deformity that may exist. Based upon the information thus obtained, advice is given and work is assigned to students in accordance with their physical needs, tastes, and capacities. Delicate students and those suffering from functional disorders receive individual attention. Students organically sound are assigned work in a carefully graded and progressive system of gymnastics and athletics. All candidates for athletic teams should enroll in the department, submit to a thorough physical examination, and pass the grade tests before being allowed to compete for positions on the various teams. Students engaging in two or more sports during the school year must undergo a physical examination preliminary to participation in each sport. This is required in order that no student may engage in athletics to his own permanent physical injury. Each student may secure a copy of his own physical measurements, and an anthropometric chart, showing in graphic form his own development as compared with the average of typical men.

Members of the teams, reporting regularly, are excused from regular class work, and are entitled to full credit in that portion of their work; but before the completion of the course at least two semesters' work must be done in the gymnasium. Credit, the equivalent of a one-hour subject, is given and counts toward the College degree. The individual's grade rests largely on the basis of attendance, punctuality, earnestness, and application, but practical tests are also given.

Regulation uniforms must be worn in the gymnasium. Students are advised not to procure uniforms until after their arrival at the College.

INSTRUCTION IN HYGIENE

125. HYGIENE AND SOCIAL PROBLEMS M. Freshmen year, first or second semester. No credit. Attendance in this course is required of all men during one semester of their first year at the College. Assistant Professor Bauer.

Hygiene and social problems are discussed. This instruction gives an insight into the practical problems of daily healthful living from a personal point of view. Directions are given for avoiding the common ills of student life, and for maintaining the highest physical and mental condition while in College, as well as for gaining the highest development of vital power and health for future duties.

INSTRUCTION IN PHYSICAL EXERCISE

This course furnishes instruction in all the various grades of gymnastic and athletic exercises offered by the department. The great variety of exercises offered is intended to meet all individual needs, capacities and tastes. A physical examination and test determines the grade or class of exercises for which a student is fitted.

101. PHYSICAL TRAINING M-I. First semester. Three hours a week. One semester credit. Assistant Professor Bauer.

During the winter the work is conducted indoors, and consists of light and heavy gymnastics, which are selected with a view to obtaining progressive effect upon the bodily organism. During the fall a man may select Rugby football or soccer football. Beginning about December first the work consists of the following:

a. *Free Calisthenics*. Exercises are selected for their different effects upon the bodily organism, and are arranged in the order of increasing difficulty. They involve hygienic or body-building work, educative movement, and corrective or remedial exercises. Both the Swedish and the German systems are used.

b. *Light Apparatus*. Training is given in the use of Indian clubs, dumb-bells, wands, bar bells, etc.

c. *Heavy Apparatus*. Graded exercises are given on parallel bars, vaulting bars, bounce board and mat, side and long horse, high and low horizontal bars, traveling and flying rings, etc.

d. *Indoor Athletics*. Instruction is given in all indoor track events preparatory to indoor track meets.

e. *Games*. There are included basketball, indoor baseball, volley ball; also, other games of more recreative nature.

102. PHYSICAL TRAINING M-II. Second semester. Three hours a week. One semester credit. Assistant Professor Bauer.

This course is a continuation of Physical Training M-I. Baseball and track and field athletics are given in the spring as soon as weather conditions permit outdoor work. A part of the regular instruction for the

spring semester is in swimming. A passing grade must be made in this phase of the work.

110. ADVANCED APPARATUS I. First semester. Three hours a week. One semester credit. Assistant Professor Bauer.

This course is open only to those men who show ability as gymnasts. From this class men are picked for the gymnastic team. Tumbling and work on the various pieces of apparatus are given.

111. ADVANCED APPARATUS II. Second semester. Three hours a week. One semester credit. Assistant Professor Bauer.

This is a continuation of Advanced Apparatus I.

115. GYMNASTIC DANCING I. First semester. Three hours a week. One semester credit. Assistant Professor Bauer.

Vigorous gymnastic steps and the more vigorous folk dances are taught.

116. GYMNASTIC DANCING II. Second semester. Three hours a week. One semester credit. Assistant Professor Bauer.

This is a continuation of Gymnastic Dancing I.

120. PHYSICAL TRAINING SPECIALTIES. Under this head come fencing, boxing, wrestling, offered as advanced work to those who have had not less than two term's work in the gymnasium. Hours are arranged with the instructor.

ATHLETICS

DEPARTMENTAL ATHLETICS. In the fall and spring terms the courses in the gymnasium are partly supplemented by instruction in outdoor athletics. Individuals are assigned to the kind of work best suited to them. Attendance is compulsory upon those participating. In the fall the following sports are offered: football; track and field events; cross-country running; and outdoor basketball. In the spring are offered: baseball; track and field events; cross-country running; and outdoor basketball.

Cross-country running is encouraged throughout the year. Natural exercise in the open air takes precedence of all other forms of exercise. Opportunity is offered for tennis, but it can not be elected in place of required work.

Days unsuited for outdoor work are devoted to a discussion of playing rules, the principles of training for athletic contests, and lectures on team work.

INTRAMURAL ATHLETICS. All athletics within the institution, including the School of Agriculture teams, come directly under the supervision of the Department of Physical Education. It is the aim of the department to furnish an opportunity for all students to participate in some form of healthy athletic competition. To carry out the above aim class football is maintained during the fall term between the different classes of the College, also between the different classes in the School of Agriculture. Basketball is also promoted during the fall and early part of the winter between the different fraternities, different classes and different cadet companies, as well as between the different departments of the institution.

The work of the spring is largely given over to competition in baseball, between the different classes, both in the College and School of Agriculture, the different departments of the institution and boarding-house teams. It is the aim of the department, too, to revive an interest in track athletics between the different classes of the institution. All these activities as promoted will be run, as nearly as possible, on a tournament plan, making it possible for a large majority of the students to participate in some form of activity. Suitable trophies will be presented and suitable emblems will be granted to participants on winning teams.

In addition to interclass competition there will be a small outside schedule for the School of Agriculture in the different forms of athletics promoted by the department.

By action of the Student Council, approved by the faculty, the following rules govern class athletic contests:

1. Managers of class teams are required to play only men who hold assignments to the class with which they play.
2. The requirements for participation in class games are the same as for varsity teams.
3. The respective managers of class athletics are required to present a certified list of eligible players to the other manager at each game.
4. No man who has been a member of the varsity squad during a given season shall participate in a class game during that season.
5. No man shall participate in a class game who has won a K in that sport.

INTERCOLLEGIATE ATHLETICS. These contests are promoted and encouraged for the more vigorous students, because of their effect upon college life, and their wide social and moral value to the participants. Intercollegiate teams should represent the final stage of selection in an educational process and development among a large number of students, thereby giving both a rational physical educational system and a healthy system of sport. Intercollegiate contests are scheduled for the different sports; namely, football, basketball, baseball, track athletics, and tennis. The College is a member of the Missouri Valley Conference and competes with the best teams in the Middle West.

Intercollegiate athletics are placed under the supervision of the Athletic Board by an order of the Board of Administration. This Athletic Board consists of the President of the College, four other members of the faculty appointed by the Board of Administration, and one member from each College class, elected by his class.

Participation in intercollegiate athletic contests is fixed by the following Missouri Valley Conference rules:

1. No student is eligible who receives pay from his institution as a regular instructor.
2. No student is eligible who receives pay for his services as player or manager of his team.
3. No student who has received pay for his athletic skill or knowledge is eligible to participate in any intercollegiate contest (except for summer baseball prior to 1912).
4. No student shall participate in contests as a member of an athletic team except on his home baseball team. No student shall play under an assumed name.
5. No student shall participate in intercollegiate sport for more than three years.
6. No graduate student shall participate in any intercollegiate contest.
7. No student shall participate in intercollegiate contests until he shall have been in attendance one full year before the date of contests, who has not passed in his entrance requirements, who has not passed in at least 30 semester hours' work during the year previous to contest, and who is not maintaining passing grades in 12 credit hours during the current semester.
8. No person having participated in any intercollegiate contest and who fails to remain in College the remainder of that semester, unless excused by his Dean for sickness, or other sufficient reason, shall participate again until he shall have completed six months of work following his last participation.

PHYSICAL TRAINING FOR WOMEN

All young women in the College are required to take two years of physical training unless excused by the Dean of Women, except that after completing one year Music Appreciation and Choral Society may be taken instead. However, a second year of physical training is required during the second year for the young women who, in the judgment of the College physician and the Dean of Women, are in such condition of health as to require a second year's work in the Department of Physical Education. Women excused from physical training on any account are required to give one credit hour in other work for each semester of physical training omitted.

After the two years' required physical training have been completed, women have the privilege of electing physical training for credit under the conditions stated above for the men.

PHYSICAL EXAMINATION

A physical examination of each young woman is made by the instructor in charge of women and the assistant College physician before permission to enter a class is given. This includes a system of body measurements, strength tests, and examination of the condition of the heart and lungs. Physical defects, abnormalities and weaknesses are noted, and special exercises are prescribed for the student needing the individual corrective work.

A suit has been adopted which consists of an all-white middy blouse, black tie, and black-plaited bloomers. The white tennis shoe with a white rubber sole is used. For swimming, girls must have the regulation one-piece tank suit made from brown cotton covert, according to a pattern approved by the Department of Physical Education or a one-piece grey knit suit. Do not buy your swimming suit before arriving in Manhattan. For further information address Women's Department of Physical Education, K. S. A. C., Manhattan, Kan.

INSTRUCTION IN PHYSICAL EDUCATION

151. PHYSICAL TRAINING W-I. Freshman year, first semester. Three hours. Assistant Professor Cahoon and Miss Loring.

The work this semester is divided into two hours a week of regular gymnasium work and one hour of esthetic dancing, folk dancing, games, tennis, hockey, basket ball, or swimming. Classes are in part held out of doors as long as the weather permits.

152. PHYSICAL TRAINING W-II. Freshman year, second semester. Prerequisite: Physical Training W-I. Assistant Professor Cahoon and Miss Loring.

In this semester the marching tactics, floor work, etc., are continued for two hours a week, and basket ball, games, esthetic dancing, folk dancing, tennis and swimming for one hour a week.

153, 154. PHYSICAL TRAINING W-I and W-II. Sophomore year. Three hours each. The work in these two semesters is a continuation of courses 151 and 152, and includes more advanced work in marching tactics and apparatus.

155. SWIMMING W. Open to all women students in the College. Individual instruction is given in this course.

Physics

Professor HAMILTON
 Assistant Professor FLOYD
 Assistant Professor RABURN
 Instructor ALLEE

Instructor J. E. SMITH
 Instructor F. R. SMITH
 Instructor PIELEMEIER

Recognizing the need of a thorough knowledge of the fundamental laws and principles involved in all physical changes, provision has been made, in the courses which follow, for both a theoretical and a practical treatment of the subject. Instruction is based upon the facts given in selected textbooks, and these topics are enlarged upon by lectures and illustrated by experimental demonstrations. The purpose is to give a training in exact reasoning, and a knowledge of principles that will be factors in the solution of problems in all branches of science as well as in everyday life.

The laboratory work which accompanies the courses in physics gives a student abundant opportunity to test the principal laws of the science; and, since he is expected to arrange and operate the apparatus, the work should enable him to acquire skill in manipulation, precision of judgment, and care in the use of delicate instruments. The laboratories are well arranged for the work, and the equipment provided is of a nature adapted to meet the requirement of accurate work in all courses. The manual in use in most of the courses is one prepared by the department to meet the exact conditions and equipment of the laboratory. A deposit of \$2 a semester is required to cover the cost of supplies and breakage.

COURSES IN PHYSICS

FOR UNDERGRADUATES

101. HOUSEHOLD PHYSICS. Freshman year, both semesters. Class work, three hours. Three semester credits. Prerequisite: One year of high school physics or its equivalent. Professor Hamilton.

This course consists of lectures and demonstrations, in which the laws relating to principles involved in appliances of the household are explained and illustrated. The work in heat is based upon thermometry, calorimetry, radiation, absorption, and methods of refrigeration and ventilation. The course includes a study of light, with its color phenomena and actinic effects; of some of the optical instruments used in scientific work; a study of electric lighting and illumination, and of cost of operating many of the appliances used in the home, including suggestions for the proper use and care of electrical apparatus for the protection of the appliances and of the operator.

111. AGRICULTURAL PHYSICS. Sophomore year, second semester. Class work, three hours. Three semester credits. Assistant Professor Raburn.

This course includes a series of lectures and class demonstrations based upon heat, light and electricity as involved in influencing farm life. The elementary factors of weather and weather forecasting are explained, and access given to the weather records and apparatus of the College weather station. The work in light emphasizes the value of light in plant growth, in spectrum analysis, and in many of the natural phenomena. Electricity is presented in such a manner that the student may gain a working knowledge of the various electrical appliances that can be used on the farm. Text: Spinny's *Physics*.

120. PHOTOGRAPHY. Elective, both semesters. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Training in physics and chemistry. Professor Hamilton.

The importance of a record of exact details, as shown in a photograph, makes this work valuable to all scientists. The course gives the student some knowledge of the chemical and physical principles involved in the art, as well as practice in making good negatives and prints. The lecture and laboratory work deals with: things to be considered in selecting a camera; proper exposures; composition of pictures; proper development of plates; tests of different developers; retouching; reducing and intensifying negatives; printing and mounting; making lantern slides, bromide enlargement, and the prints best adapted for illustrated articles in newspapers and magazines.

130. WIRELESS TELEGRAPHY. Elective, both semesters. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Elementary physics. Professor Hamilton and Assistant _____.

The work includes a study of the most efficient types of receiving and transmission sets, a study of the fundamental principles of electric waves, and of the most important points to be observed in the erection of a good plant.

Laboratory.—The student learns in the laboratory to receive and to transmit messages and as he learns the code he is instructed in field work.

FOR GRADUATES AND UNDERGRADUATES

201. GENERAL PHYSICS I. Sophomore year, first semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisites: Elementary physics and Plane Trigonometry. Assistant Professor Floyd.

This course, like the one following, is provided for those intending to specialize in scientific lines. It covers, in as thorough a manner as possible, the general principles involved in mechanics, sound, and heat. Text: Reed and Guthe's *College Physics*.

Laboratory.—The work is based upon laws and principles discussed in the classroom, and is so arranged that the students may have a practical illustration of the facts learned.

202. GENERAL PHYSICS II. Sophomore year, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisite: General Physics I. Assistant Professor Floyd.

This course includes a study of the theory of electricity and light. The class follows the subject as outlined in the text, but special emphasis is placed upon those parts that have an immediate bearing on the work of other sciences, such as electrolysis, thermal effects, relation of electrical and mechanical energy. Text: Reed and Guthe's *College Physics*.

Laboratory.—The work follows the subjects presented in the class, and is conducted with a grade of apparatus that gives training in the use of the better class of instruments employed in scientific investigations.

211. ENGINEERING PHYSICS I. Sophomore year, both semesters. Class work, four hours; laboratory, three hours. Five semester credits. Prerequisites: Elementary physics and Trigonometry. Professor Hamilton or Assistant Professor Raburn.

This course in mechanics, sound and heat, is intended to give the engineering students as thorough a working knowledge as possible of the fundamental units and laws involved in force, work, power, and energy; also the laws of simple machines, gases, and liquids as they occur in the transformation of force and energy. Text: Kimball's *College Physics*.

Laboratory.—The work consists of the use of apparatus to test the laws of inertia, moments of force, moments of torsion, elasticity, and

rigidity, and other laws and principles involved in mechanics and heat. Accurate measurements and carefully recorded data are required.

212. ENGINEERING PHYSICS II. Sophomore year, both semesters. Class work, four hours; laboratory, three hours. Five semester credits. Prerequisite: Engineering Physics I. Professor Hamilton or Assistant Professor Raburn.

This course treats of electricity and light. The work in electricity is of such a nature as to give the student working knowledge of the units employed, and of the fundamental laws; and to acquaint him with methods of producing a current, its uses, and the system by which electrical energy is measured. The principal phenomena of light, together with the laws that may have direct bearing upon light as a standard and method of measurement, are treated in this course. Text: Kimball's *College Physics*.

Laboratory.—The electrical work in this course includes measurements of resistances, a study of primary cells, and the transformation of mechanical into electrical energy. The work of light consists of a study of the laws of reflection and refraction, and measurements of wave lengths by means of the spectroscope, the use of the interferometer, and photometry.

213. ACOUSTICS. Junior year, first semester. Class work, one hour. One semester credit. Prerequisite: Engineering Physics II. Assistant Professor Floyd.

In this course a special study is made of the acoustic properties of buildings, of the architectural defects which give rise to poor acoustics, with a study of special methods used to avoid such troubles in construction of buildings or to correct them in constructed buildings.

221. MOLECULAR PHYSICS. Elective, first semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisites: College Physics and College Chemistry. Assistant Professor Floyd.

This course includes a study of molecular kinetics of gases, liquids and solids; liquid-gas systems; crystal-gas systems; crystal-liquid systems; Brownian movement; solutions, osmosis, and electrolytic conduction.

Laboratory.—The laboratory work is based on the theory as given in the class work, and includes the determination of capillary constants, molecular conductivities, percentage ionization, and specific heats of gases.

222. HARMONICS. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: One year each of music and elementary physics. Assistant Professor Floyd.

This course is given to students of music so that they may learn the fundamental principles of sound that are associated with harmony. It is a lecture and demonstration course that deals with many facts of interest relating to the construction of scales and chords. A clearer understanding of composition and of tone quality may be had if the physical laws of sound are understood.

223. PHYSICAL MEASUREMENTS. Elective. Class work, two hours; laboratory, three hours. Three semester credits. Professor Hamilton or Assistant Professor Floyd.

The class work is based upon principles that are involved in instruments for accurate measurements. The instruments described and used are typical ones employed in measurements of mechanical forces, heat, and electricity. Part of the class work is the development of formulas.

Laboratory.—The work is so selected as to give the widest possible range in the variety of instruments used and of principles illustrated.

224. SPECIAL METHODS IN THE TEACHING OF PHYSICS. Elective. Class work, two hours. Three semester credits. For credit towards the State certificate for teachers this must be taken in the student's senior year. Prerequisites: Educational Psychology, College Physics. Assistant Professor Floyd.

This course is intended for those who are either teaching or expecting to teach physics in secondary schools. The class work includes an analysis of the present status of physics and of physics instruction in our high schools, and is based upon a critical study of the State text as well as other modern texts that may be used as reference. Special effort is made to vitalize the work and to make it apply to everyday life. Lectures, library work, demonstrations and practice teaching are used as methods of directing the course.

Laboratory.—The laboratory work includes the formation and adaptation of courses suitable for either rural or city high schools.

Public Speaking

Assistant Professor EMERSON in Charge

It is the constant effort of the Department of Public Speaking to relate the training in public speaking with the work of all the other departments of the College; to harmonize it with the spirit of the school, which is distinctly technical and industrial. With this object in view, students are trained in the presentation and discussion of the valuable ideas acquired in their various fields of study. The method pursued in this training is that of actual practice on the platform before an audience. Conviction, not entertainment, is the dominant purpose in every case.

The department seeks to place itself at the service of those various organizations of the College which desire or need its assistance. In addition to its regular courses it aims to make itself available as far as possible for individual rehearsals; for the training of the debaters and orators of the College; and for the directing and coaching of plays. Students are urged to ally themselves with the organizations representing these various activities.

COURSES IN PUBLIC SPEAKING

FOR UNDERGRADUATES

101. PUBLIC SPEAKING I. Elective, both semesters. Class work, two hours. Two semester credits. Assistant Professor Emerson.

The purpose of this course is to enable the student to attain some proficiency in the art of oral interpretation. The training given seeks to develop a natural style. In connection with the practice work upon the platform the student is given such points of theory and such routine drill as are necessary for the development and use of the voice and for proper platform deportment.

102. PUBLIC SPEAKING II. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Public Speaking I, or by arrangement with the head of the department. Assistant Professor Emerson.

This course is a continuation of Public Speaking I, and involves a more advanced study of the art of oral interpretation.

FOR GRADUATES AND UNDERGRADUATES

201. EXTEMPORE SPEECH I. Sophomore, junior, and senior years, both semesters. Class work, two hours. Two semester credits. Assistant Professor Emerson.

The work of this course consists in the preparation and delivery of short addresses based on prepared outlines. Careful preparation of material is required. The plan of the speech is made in advance, but the choice of language is left for the moment of speaking. Criticism and points of theory given by the instructor supplement the course.

202. EXTEMPORE SPEECH II. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Extempore Speech I, or its equivalent. Assistant Professor Emerson.

This course is a continuation of Extempore Speech I. The same methods are pursued but special attention is given to the telling of humorous stories, to after-dinner speaking, and the like.

203. ADVANCED PUBLIC SPEAKING. Elective, second semester. One semester credit. Prerequisites: Extempore Speech I and II, or by special arrangement with the head of the department. Assistant Professor Emerson.

In this course the work consists of the preparation and delivery by the student of one extended lecture-recital, lecture, or address during the semester. This is supplemented by class lectures and practice, and by a study of types. It may include the preparation and delivery of institute talks, or of addresses suitable for extension work.

Zoology

Professor NABOURS
Associate Professor ACKERT
Assistant Professor HARMAN
Instructor DICE

Instructor HERSH
Assistant REED
Assistant PARK
Assistant WEHLE

The courses have been planned to give a fundamental knowledge of the structures, functions and relations of animals; information concerning the manner in which animals respond to the conditions of the environment; an appreciation of their human values; and a consideration of the problem of heredity and evolution.

The courses in General Zoölogy (101 and 102, and 105) constitute a general survey, and form an excellent introduction to all lines in Agriculture, General Science and Home Economics. The courses in Embryology (117), Cytology (214), Advanced Mammalian Embryology (220), Parasitology (123), Evolution and Heredity (217), and Paleontology (Geology 201) are preliminary to advanced work in Animal Breeding, Animal and Dairy Husbandry and Veterinary Medicine. Selections may be made among these courses and Advanced Zoölogy (201, 202), Invertebrate and Vertebrate Taxonomy (205, 208), Economic Zoölogy (126), Ecology (211), Embryology and Physiology (108), Zoölogical Problems (129), Research in Zoölogy (301), and the Seminar (236), by those who expect to do advanced work in Zoölogy or Entomology, or become teachers of Biology.

The classrooms and laboratories are equipped with charts, models, microscopic binoculars, microtomes, paraffin baths and other apparatus both for elementary and advanced work, and a good natural-history museum is available.

COURSES IN ZOOLOGY

FOR UNDERGRADUATES

101 and 102. GENERAL ZOÖLOGY I AND II. Sophomore year, first and second semesters, respectively. Class work, two hours; laboratory, three hours. Three semester credits for each course. Professor Nabours, Associate Professor Ackert, Assistant Professor Harman, and Instructors Dice and Hersh.

In General Zoölogy I an elementary study is made of the structures and functions of types selected to illustrate the invertebrates; in course 102 an elementary study is made of the structures and functions of types selected to illustrate the development of the phylum chordata.

Laboratory.—The form and activities of animals are observed both in the field and in the vivaria, and of the dissection and sketching of the important systems of those animals selected as types.

105. GENERAL ZOÖLOGY. Sophomore year, both semesters. Class work, three hours; laboratory, six hours. Five semester credits. Men and women in separate classes. Professor Nabours, Associate Professor Ackert, Assistant Professor Harman, and Instructors Dice and Hersh.

The structures and functions of types of both invertebrates and vertebrates are studied.

Laboratory.—Studies of the form and function of types of living animals, and dissection and reconstruction of the important systems of selected types.

108. EMBRYOLOGY AND PHYSIOLOGY. Sophomore year and elective, both semesters. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisites: Zoölogy 105 or equivalent, and Chemistry 121. Assistant Professor Harman, Assistant Reed, Professor Nabours, and Associate Professor Ackert.

The first three-fifths of the semester is devoted to (a) Embryology and the remaining two-fifths to (b) Human Physiology. The course thus falls into two closely related parts: (a) a study of the development of the germ cells, fertilization, origin of the germ layers, initiation and growth of systems of organs, establishment of foetal relations, and nutrition and growth with special reference to the human; and (b) a study of the functions of the organs and systems of the human body, with special consideration of the digestive, respiratory, circulatory, nervous, and urinogenital systems and organs of special sense.

Laboratory.—Studies of the male and female germ cells, stages in the process of fertilization, the segmenting ovum, and whole mounts and serial sections of the chick and pig embryos in several stages of development, with demonstrations of types of mammalian foetal relations. (b) Experiments for the demonstration of the composition and functions of bone, blood, lymph, and the reaction of muscles, nerves, parts of the digestive, respiratory, excretory and other systems.

111. GENERAL ZOÖLOGY. Freshman year, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Given concurrently with Veterinary Medicine 201. Associate Professor Ackert and Instructors Dice and Hersh.

A general study is made of the forms in the animal kingdom, with attention given to classification, distribution, habitats, and relation to each other and to man.

Laboratory.—The form and activities of animals are observed in the field, vivaria and the museum, and a comparative study of the systems of organs in a few selected types are studied comparatively.

114. EMBRYOLOGY VET. Freshman year, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Given concur-

rently with Vet. Med. 202 and 214. Prerequisite: Zoölogy III, and Vet. Med. 201 and 213. Associate Professor Ackert and Instructors Dice and Hersh.

The origin of the germ cells, fertilization, the establishment of relations between the uterus and embryo, the development of membranes, and the nutrition of the foetus in mammals are considered briefly.

Laboratory.—Exercises in the reconstruction of organs and systems from sections and dissections in the chick and pig embryos, and of foetal relations in mammals.

117. EMBRYOLOGY. Junior and elective, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Zoölogy 101 and 102 or 105. Professor Nabours, Associate Professor Ackert, Instructors Dice and Hersh.

The development of the germ cells, fertilization, origin of the germ layers, initiation and growth of systems of organs, establishment of foetal relations, and nutrition and growth in mammals are studied in this course.

Laboratory.—Studies of the male and female germ cells, stages in the processes of fertilization, the segmenting ovum, and whole amounts, serial sections and reconstructions of the chick and pig embryos in several stages of growth, with demonstrations of types of mammalian foetal relations.

123. PARASITOLOGY. Required and elective, senior year, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Zoölogy III, or 101 and 102, or 105. Associate Professor Ackert.

A study is made of the biology, life histories and economic importance of the external and internal parasites of the domestic animals and man.

Laboratory.—A study of the structural and functional adaptations of selected types of parasites.

126. ECONOMIC ZOÖLOGY. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Associate Professor Ackert.

The bird and mammal groups are studied comprehensively. Specimens in the museum are used extensively.

Laboratory.—The laboratory work comprises largely three-hour field trips to a number of selected areas: woods, streams, meadows, College campus, and farm. This work includes identification of birds and mammals, with special studies of their migration, adaptation and economic importance.

129. ZOÖLOGICAL PROBLEMS. Elective, both semesters. One or two semester credits. Prerequisites: Consult instructors. Professor Nabours, Associate Professor Ackert, Assistant Professor Herman, and Instructor Dice.

Individual problems in heredity, parasitology, cytology and embryology and animal behavior are assigned by the instructors with whom the work is done.

FOR GRADUATES AND UNDERGRADUATES

201. ADVANCED INVERTEBRATE ZOÖLOGY. Elective, first semester. Class work, two hours; laboratory, six hours. Four semester credits. Prerequisite: Zoölogy 101 and 102, or 105. Associate Professor Ackert.

A study is made of representatives of the invertebrates, including behavior, comparative anatomy, development and phylogeny.

Laboratory.—Representatives of the invertebrate groups are studied from the anatomical standpoint.

202. **ADVANCED VERTEBRATE ZOÖLOGY.** Elective, second semester. Class work, two hours; laboratory, six hours. Four semester credits. Prerequisites: Zoölogy 101 and 102, or 105. Associate Professor Ackert.

The behavior, comparative anatomy, development and phylogeny of the vertebrates are studied in this course.

Laboratory.—A study is made of the anatomy of certain representative vertebrates.

205. **TAXONOMY OF INVERTEBRATES.** Elective, first semester. Laboratory, nine hours. Three semester credits. Prerequisites: Zoölogy 101 and 102, or 105 and Entomology 216. Instructor Dice.

Practice is had in the use of keys for the identification of species, and emphasis is placed on familiarity with the literature of invertebrate taxonomy, except insects, and on the identification of species in the local fauna.

208. **TAXONOMY OF VERTEBRATES.** Elective, second semester. Laboratory, nine hours. Three semester credits. Prerequisites: Zoölogy 101 and 102, or 105, and Entomology 216 concurrently.

This course is similar to course 205, with the difference that the subject matter consists of vertebrates instead of invertebrates.

211. **ANIMAL ECOLOGY.** Elective; second semester. Lecture, one hour. Laboratory and field work, six hours. Three semester credits. Prerequisites: Zoölogy 101 and 102, or 105, and Entomology 101. Associate Professor Welch (from the Department of Entomology).

This course deals with the relation of animals to the complete environment. The associational method of study is used and the subject is considered from the descriptive, comparative and explanatory standpoints. Special attention is given to the dynamic factors of the environment and their effect on the present status and future changes of the animal community. The field work gives practice in the methods of field ecology and deals with the application of general principles to local conditions. The fundamental principles and other general aspects of the science are presented in the form of lectures.

214. **CYTOLOGY.** Elective, first semester. Lecture, two hours; laboratory, three or six hours. Three or four semester credits. Prerequisites: Zoölogy 108, 117, or equivalent. Assistant Professor Harman.

Methods of preparing material for microscopical study; killing, fixing, staining, and sectioning. The development of the germ cells; theories of structure and functions of the different parts of the cell. The work forms a basis for studies of heredity and related subjects.

217. **EVOLUTION AND HEREDITY.** Elective, second semester. Lecture, two hours; library reference reading and reports, three or six hours. Three or four semester credits. Prerequisites: Consult instructor. Professor Nabours.

A lecture and reading course dealing with the development of the idea of evolution; the evidence and the principal theories of the causes; problems of variation, heredity, and experimental evolution.

220. **ADVANCED MAMMALIAN EMBRYOLOGY.** Elective, second semester. Lectures, two hours; laboratory, three or six hours. Three or four semester credits. Prerequisites: Zoölogy 108, 114 or 117, or the equivalent. Professor Nabours and Assistant Professor Harman.

The course consists of a further study of the main facts of embryology with special reference to their bearing upon biological theories, the consideration of embryological problems, and a comparative study of the physiology of reproduction in mammals, including man.

225. ZOÖLOGICAL AND ENTOMOLOGICAL SEMINAR. Each semester. One two-hour session a week. One credit. Subject matter changes each semester. Prerequisite: Consult seminar committee.

This course consists in the presentation of original investigations, reviews of papers appearing in current journals, summaries of recent advances in the various fields, and discussions of the various aspects of the fundamental problems of modern biology.

FOR GRADUATES

301. RESEARCH IN ZOÖLOGY. Elective, both semesters and during the summer. One to five semester credits. Prerequisites: Consult instructors. Professor Nabours, Associate Professor Ackert, Assistant Professor Harman, and Instructor Dice.

Individual research problems in heredity and experimental evolution, parasitology, cytology and embryology, and animal behavior are assigned.

Special Courses for Teachers

At the present time the teaching of vocational subjects in the public schools is undergoing great development. Many schools are introducing manual training, agriculture, domestic science and domestic art, and many others are extending the work hitherto given. The State law requiring the teaching of agriculture in the rural schools is also creating a strong movement in the same direction. There is an active demand for teachers who can handle such work successfully.

The College offers to graduates of other institutions, and indeed to all who have studied such subjects as may be prerequisite, unexcelled facilities for securing training in the industrial subjects indicated. Courses extending over one or two years may be arranged by means of which the student who is already prepared in English, mathematics, and to a certain extent in the sciences, may prepare himself to enter a broader and, frequently, a more remunerative field.

Nos. 31, 32, 33, 35, 36 and 37, on pages 250 to 251, exhibit groupings that illustrate the possibilities in work of this character, and other arrangements may be made. Those taking such courses will be cared for in the regular classes provided for other students, and no limitation is imposed except that the prerequisites for any subject must have been taken previously, here or elsewhere. These prerequisites are stated in this catalogue in connection with the description of each subject. The catalogue also shows the semester in which a subject is regularly given.

The Summer School

June 22 to August 3, 1917.

EDWARD HARTMAN REISNER, *Acting Director*
HARRY LLEWELLYN KENT, *Acting Assistant Director*

PURPOSE

There is no larger or better equipped plant devoted to the teaching of agriculture, home economics, mechanic arts and related subjects than Kansas has in her State Agricultural College. In order that this plant may not remain idle during the summer months, the Board of Administration has authorized the organization of a Summer School. The College is authorized by an act of Congress to expend each year a portion of the national appropriation for "providing courses for the special preparation of instructors for teaching the elements of agriculture and mechanic arts."

Each year there is an increasing demand for trained teachers of agriculture, shop work, mathematics, the sciences and home economics. The College has not been able to supply this demand. The Summer School offers an opportunity for experienced teachers to prepare themselves to meet the new demand placed upon the public school, viz.: Preparing the boys and girls for vocational and social efficiency.

ADVANTAGES AT KANSAS STATE AGRICULTURAL COLLEGE

There is a growing conviction among the leading educators that the best institution in which to train teachers of vocational subjects is a well-equipped technical college, where the courses of study are pointed towards the producing vocations. The Kansas State Agricultural College is such an institution.

The College campus occupies a commanding and attractive site upon an elevation adjoining the western limits of the city of Manhattan, with electric car service into town and to the railway stations. The grounds are tastefully laid out according to the designs of a landscape architect, and are extensively planted with a great variety of beautiful and interesting trees, arranged in picturesque groups, masses and border plantings, varied by banks of shrubbery and interspersed with extensive lawns, gardens and experimental fields. Broad, macadamized and well-shaded avenues lead to all parts of the campus. Including the campus of 160 acres, the College owns 748 acres of land. Outside the campus proper all the land is devoted to practical and experimental work in agriculture. Within the College grounds most of the space not occupied by buildings or needed for drives and ornamental planting is devoted to orchards, forest and fruit nurseries, vineyards, and gardens.

The College buildings, twenty-one in number, are harmoniously grouped, and are uniformly constructed of attractive white limestone obtained from the College quarries. The College owns and operates its own system of waterworks, and is provided with a complete sewerage system.

The library will be open during the summer and its valuable collection of books, periodicals, bulletins and reports will be placed at the service of the Summer School students.

EXPENSES

Tuition is free. An incidental fee* of \$3 and a medical fee of 50 cents are charged all students whose homes are in Kansas. For nonresidents of the State an incidental fee of \$10 and a medical fee of 50 cents are charged. Receipts for these fees must be presented before enrolling in the Summer School classes. Table board varies from \$3.50 to \$4 a week. Three meals a day, except on Sunday, are served at the College cafeteria in Kedzie Hall. Room rent ranges from \$6 to \$12 per month. Accredited lists of rooming houses for men and for women may be had of Professor J. O. Hamilton at his office, C 57. The College Young Men's Christian Association offers accommodation in its building for a limited number of men students at prices ranging from \$10 to \$12 a month. The cost of rooms is reduced by half where two students room together.

REGISTRATION AND LATE REGISTRATION

Registration will take place in Nichols Gymnasium from eight until five o'clock on the opening day, Friday, June 22. No one will be allowed to register for full-time work after Friday, June 29. All class and laboratory work begins with the first period, Saturday, June 23.

CHANGE TO SEMESTER PLAN OF ORGANIZATION

Beginning with the Summer School of 1917, the instruction in the College will be organized on the semester plan instead of on the term plan as heretofore.

COLLEGE CREDITS AND VISITING PRIVILEGES

Full College credit† will be given for all courses satisfactorily completed by regularly matriculated students unless otherwise specified in the announcement of courses. Students desiring College credit will not be allowed to carry more than six *semester credit hours* of work. Those interested primarily in freshening their acquaintance with subject matter, in enlarging their outlook or in improving their methods of teaching, and not caring for credit toward a degree, may, upon showing a receipt for Summer School fees, be given a visitor's card, which will admit them to any courses offered. They should, however, make out class cards for any courses which they wish seriously to pursue. A limited visiting privilege may be granted to candidates for College credit by the Director in case such privilege be not likely to interfere with the quality of the College-credit work.

* A new schedule of summer school fees, in effect the summer of 1918, is announced elsewhere in this catalogue.

† Note that beginning with this session of the Summer School the credits given are semester credits, not term credits as formerly.

CONVOCATION AND COLLEGE LECTURES

The hour from eleven to twelve daily except Monday is reserved for general assembly of all students and members of the faculty. At least once a week the program is musical or literary in nature, including numbers by the Summer School music staff, by visiting artists and by the Summer School chorus and orchestra. Every student with musical ability is urged to join one of the musical organizations. The remaining days of the week are devoted to lectures by visiting instructors and by teachers of the College. Dr. David Snedden, ex-Commissioner of Education for Massachusetts, now Professor of Educational Administration, Teachers College, New York City, will deliver a series of lectures on topics of Educational Organization and Administration during the week beginning June 24. Mrs. Henrietta Calvin, specialist in home economics for the United States Bureau of Education, will occupy the week beginning July 23 with a survey of Home Economics Education. Dr. Edward Burnham, Professor of Rural Education, Western State Normal School, Kalamazoo, Mich., will speak July 30 and 31 and August 1 on problems in his special field. Other speakers will be Hon. W. D. Ross, State Superintendent of Public Instruction for Kansas, Dr. Henry Jackson Waters, President of the Kansas State Agricultural College, Mr. C. E. St. John, Assistant State Superintendent of Public Instruction for Kansas, Dr. Layton S. Hawkins, Specialist in Agricultural Education for the University of the State of New York, Miss Grace Schermerhorn, formerly Associate Professor of Home Economics Education, Iowa State College, Dean William M. Jardine, Dean Mary Pierce Van Zile, Professor L. A. Fitz and Professor M. C. Tanquary.

RECREATION AND AMUSEMENT

On Thursday evening of each week a special program for relaxation and enjoyment will be offered on the College campus. Last summer, out-of-door-moving picture shows, "community sings" and folk games proved to be of general interest to students and townspeople alike. These programs will be continued and improved upon in the Summer School of 1917. The vicinity of Manhattan abounds in beautiful and easily accessible spots for "hikes" and picnics. Fort Riley is only forty minutes distant by trolley, and a trip to the fort on riding-school day makes an enjoyable and instructive outing. For those who appreciate opportunities for literary and forensic improvement, combined with social good times, the Summer School Literary Society meets Saturday evening of each week and is open to all students.

Courses in the Summer School

Division of Agriculture

W. M. JARDINE, *Dean*

AGRONOMY

Professor CALL
Associate Professor THROCKMORTON
Assistant Professor KENNEY
Instructor ZAHNLEY

FORAGE CROP PRODUCTION. Class work, six hours; laboratory, four hours. Three credits. Assistant Professor Kenney.

This course consists of a study of the growth, distribution, culture and uses of hay, pasture, and forage crops. Text: Piper's *Forage Plants and Their Culture*.

SOILS. Class work, five hours; laboratory, eight hours. Three credits. Associate Professor Throckmorton.

This course comprises a study of the management of farm soils and deals with the origin of soils and their physical nature; the effect of different methods of cultivation upon the liberation of plant food; conservation of moisture; and physical condition of the soil. Prerequisite: General Chemistry. Text: Lyon, Fippen and Buckman's *Principles of Soil Management*.

SOIL FERTILITY. Class work, six hours; laboratory, four hours. Three credits. Professor Call.

This course involves a study of the effect of different crops and different systems of farming upon the fertility of the soil; the use of barnyard manure, including proper methods of handling, preserving, and applying it; and determination of the needs of soils for commercial fertilizers and lime. Prerequisites: Quantitative Analysis, and Soils. Text: Hopkins' *Soil Fertility*.

ELEMENTARY AGRICULTURE. Class work, seven and a half hours. Three credits. Instructor Zahnley.

This is a general course planned for teachers of the public schools who teach one year of agriculture. It covers the entire field of general agriculture together with suggested outlines for a year's work in the laboratory. Text: Waters' *Essentials of Agriculture* and Call and Schafer's *Manual of Agriculture*.

ANIMAL HUSBANDRY

Professor COCHEL
Professor WENTWORTH
Assistant Professor VESTAL
Instructor PATERSON

ANIMAL HUSBANDRY I. Class work, three hours; laboratory, twelve hours. Three credits. Instructor Paterson.

This course consists of a study of the market and breeding types and classes of horses, cattle, sheep, and swine. The purpose of this course is to give to the student a knowledge of animals which will be in feed lots and on breeding farms.

ANIMAL HUSBANDRY IV. PRINCIPLES OF BREEDING. Class work, seven and a half hours. Three credits. Assistant Professor Vestal.

This course involves a study of the digestive system and the processes of nutrition, and of the theory of practical economy of rations, both for the maintenance and for the fattening of all classes of farm animals. Prerequisite: Elementary Organic Chemistry.

ANIMAL HUSBANDRY XII. PRINCIPLES OF GENETICS. Class work, seven and a half hours. Three credits. Professor Wentworth.

This course embraces the general principles of heredity, variation, sex-limited inheritance, prepotency, fertility, and sterility, systems of breeding, and the influence of pedigree and herd-book standards.

TEACHERS' COURSE IN ANIMAL HUSBANDRY. Class work, five hours. Two credits. Professor Cochel.

This course is planned to give a general review of the live-stock industry with the purpose of encouraging a better standing of the teaching of animal husbandry in secondary schools. The course will include some work in judging and some attention will be paid to production.

DAIRY HUSBANDRY

Professor REED
Instructor OLSON

ELEMENTS OF DAIRYING. Class work, five hours; laboratory, six hours. Three credits. Professor Reed and Instructor Olson.

This is a general course in dairying, dealing with the secretion, composition and properties of milk; care of milk and cream on the farm, a study of the different methods of creaming, construction and operation of farm separators; principles and application of the Babcock test; use of the lactometer; and buttermaking on the farm. Lectures are supplemented by textbook work.

Laboratory.—Practice in operating the Babcock test and lactometer; separation of milk; and farm buttermaking.

DAIRY JUDGING. Laboratory work, six hours. One credit. Professor Reed.

Dairy stock is judged from the standpoint of economical production and breed type. Score cards are used to teach the students to become accurate, thorough and systematic in the selection of animals as representatives of breeds or for breeding purposes.

HORTICULTURE

Professor DICKENS
Professor AHEARN

FRUIT GROWING. Class work, five hours; laboratory, six hours. Three credits. Professor Dickens.

This course gives the student an opportunity to become acquainted with the general principles and specific problems of the various phases of fruit growing. It includes a study of the principles of pruning and a survey of the work already done in the preparation of soil. The course is especially adapted to those who desire to be able to advise and supervise home projects in fruit growing.

Laboratory.—The work affords practice in pruning, grafting and budding exercises and the students have the opportunity to visit near-by orchards and study the different characteristics of the fruit-bearing trees.

PLANT PROPAGATION. Class work, five hours; laboratory, six hours. Three credits. Professor Dickens.

This course gives the student an opportunity to connect his theoretical knowledge of botany with the practical manipulation of plants and to

extend his knowledge to include plants that are of the most importance commercially. Instruction is given in methods of nursery practice in propagation of conifers, deciduous, ornamental and shade trees as well as fruit trees and smaller ornamental shrubs.

Laboratory.—Practical work is given in preparation of seeds, seed testing, transplanting, grafting, budding and greenhouse practice in the propagation of particular species that are of importance to the florist in decorative work.

VEGETABLE GARDENING. Class work, five hours; laboratory, six hours. Three credits. Professor Ahearn.

This course is arranged with the idea that the student desires to obtain information in the theory and practice of growing vegetables for home and for market, and is particularly designed to fit the student for the supervision of school-garden work. Text-book work is supplemented by lectures on vegetable growing, with special emphasis on Kansas conditions. Text: Lloyd's *Productive Vegetable Gardening*.

Laboratory. The work is entirely practical and consists in actual work in the garden; seeding, methods of cultivation; harvesting and marketing of vegetables. Several visits are made to near-by vegetable gardens in order to give the students information as to the best methods of growing vegetables for commercial purposes.

LANDSCAPE GARDENING. Class work, five hours. Two credits. Professor Ahearn.

This course takes up the principles of landscape gardening with special reference to beautifying home, city, and school grounds. The students have opportunity to become acquainted with a great many varieties of trees and shrubs as there is a wealth of plant material on the College campus. Special emphasis is given to the planting of home yards, large estates and public grounds.

KITCHEN GARDENING. Five hours. Two credits. Professor Ahearn.

Lectures are given on the requirements for home-grown vegetables and other plants; on soil, fertilizers and seeds; on the planting, cultivation and needs of various groups of species.

POULTRY HUSBANDRY

Assistant Fox
Superintendent HARRIS

FARM POULTRY PRODUCTION. Class work, three hours; laboratory, six hours. Two credits. Assistant Fox.

This course takes up the problems of poultry management on the general farm. The subjects of feeding, breeding, incubating, brooding, and preparing for market are studied.

PRACTICE IN INCUBATION. Three times a day, seven days a week, for a period of four weeks, at hours outside the regular schedule. One to three credits. Mr. Harris.

This course consists of the care of an incubator by the student through the incubation period, testing the eggs, and bringing off the hatch. Careful records of fertility, cost of incubation and varying temperature, moisture and ventilation conditions are kept. For one credit, one successful hatch must be brought off in either a hot-air or a hot-water incubator. For further credit, the other types must be operated. Students specializing in poultry husbandry must take three credits.

PRACTICE IN BROODING. Three times a day, seven days a week, for a period of four weeks, at hours outside the regular schedule. One to three credits. Mr. Harris.

In this course each student handles a flock of chicks. He has the entire care of brooding and feeding them during the four most critical weeks. A report of fuel and feed, of gain in weight, and of mortality, is required. This course must be preceded or accompanied by Practice in Incubation. For one credit a group of at least fifty baby chicks must be successfully brooded for four weeks in any one of the several types of brooders. For further credits, broods must be handled successfully in two other types of brooders. Students specializing in poultry husbandry must take three credits.

POULTRY BREEDS AND TYPES. Class work, three hours; laboratory, six hours. Two credits. Assistant Fox.

In this course a historical study is made of the various breeds commonly found on Kansas farms. Particular attention is paid to tracing the evolution of the present breed types. The laboratory is given over largely to judging the different breeds and varieties both by score cards and by comparison.

MARKET POULTRY. Class work, three hours; laboratory, six hours. Two credits. Assistant Fox.

In this course the lectures cover the methods of handling market poultry alive and dressed. The laboratory work consists of practice work in caponizing, killing, bleeding, packing, cooling, and grading poultry for market.

VETERINARY MEDICINE

Professor DYKSTRA
Associate Professor BURT

PHYSIOLOGY. Class work, seven and a half hours. Three credits. Associate Professor Burt.

The work in this subject consists of the study of the skeletal tissues, the circulatory, digestive, respiratory and other systems in much the same manner as is done during the regular College course. The lectures are supplemented with demonstrations and experiments. Dissected specimens are used as often as possible instead of papier-maché models. The laboratory is well equipped with physiological apparatus. This apparatus is freely employed and its application explained. The demonstrations and experiments are especially helpful to those engaged in teaching and those intending to teach this subject. Credit in this course is the same as the credit in Human Physiology. It may be substituted for Animal Physiology. Text: Martin's *Human Body*. References are also made to Howell's *Textbook on Human Physiology*, and others. Teachers are recommended to use the text by Howell.

FARM ANIMALS IN HEALTH AND DISEASE. Class work, seven and a half hours. Three credits. Professor Dykstra.

In this course the common diseases of domesticated animals are discussed, and particular attention is devoted to first-aid treatment, preventive measures against the spread of contagious and infectious diseases, methods of taking temperatures, counting the pulse and respiration, modes of administering drugs, bandaging, etc. Various aids to correct diagnosis, particularly tuberculin testing of dairy and beef animals, are taken up. A few lectures on the more commonly used medicines are included. When clinical cases are available they are used to visualize the instruction given in the class room. This is a course for teachers and students of agriculture and for those engaged in agricultural pursuits.

Division of Mechanic Arts

A. A. POTTER, *Dean*

APPLIED MECHANICS AND MECHANICAL DRAWING

Professor SEATON

MECHANICAL DRAWING FOR HIGH SCHOOLS. Lectures and recitations, two hours; drafting, eight hours. Two credits in the School of Agriculture.

A course intended for high-school teachers of mechanical drawing and for those desiring to make College entrance credits. The work of the course will be varied to suit the previous training of those who register for it. A study is made of drawing instruments and materials, drawing-room practice and conventions, lettering, orthographic projection and simple working drawings. Practice is also given in tracing and blue-printing. Text: Weick's *Elementary Mechanical Drawing*.

MECHANICAL DRAWING I. Lectures and recitations, one and one-half hours; drafting, six hours. One and one-third credits.

This course includes the use and care of drawing instruments, with simple exercises in making working drawings from given plates. Special attention is given to the arrangement of views to secure balance, and to the subject matter and layout of titles and notes. The following supplies are required: Triangles, T-square, scale, pencils, pens, ink, eraser, thumb tacks, drawing paper, and a set of drawing instruments. Students are advised not to purchase these until after consulting with the instructor. Text: French's *Engineering Drawing*.

MECHANICAL DRAWING II. Class work, one and a half hours; drafting, ten hours. Two credits.

Free-hand sketches are made from simple machine parts, followed by complete working drawings from these sketches without further reference to the objects. Special emphasis is laid upon the proper selection of views to present the necessary information in convenient form, and to the dimensioning of the drawings. Text: French's *Engineering Drawing*.

KINEMATICS I. Lectures and recitations, seven and a half hours. Two and two-thirds credits. Prerequisites if taken for credit: Plane Trigonometry, Descriptive Geometry II. Persons not taking the work for credit may be assigned to it without these prerequisites, by permission from the head of the department.

An analysis of the motions and forms of the parts of machines constitutes this course. Among the subjects discussed are: bearings, screws, worm and wheel, rolling cylinders, cones, and other surfaces; belts, cord and chains, levers, cams and linkwork, with the velocity and motion diagrams; quick returns, straight-line motions, and other special forms of linkages; wheels in trains; curves for gear teeth. The solution of a large number of graphical and mathematical problems is required in this course. Text: Schwamb and Merrill's *Elements of Mechanism*.

APPLIED MECHANICS I. Class work, seven and a half hours. Two and two-thirds credits. Prerequisites: Integral Calculus, and Engineering Physics.

This course includes composition, resolution and conditions of equilibrium of concurrent and nonconcurrent forces; center of gravity; laws of rectilinear and curvilinear motion of material points; moments of inertia; relations between forces acting on rigid bodies and the resulting motions; work energy and power; graphical solutions of problems in statics. Text: Hancock's *Applied Mechanics for Engineers*.

MANUAL TRAINING

Professor BRAY
Assistant PARKER

MANUAL TRAINING METHODS AND ORGANIZATION. Class work, five hours. Two credits. Professor Bray.

This course deals with the history of manual training in the United States as well as a similar development in foreign countries. A study is made of the different systems, the various forms of hand work, and the grades to which they are best adapted; the equipment and material required for each of the various lines of work, together with their cost and where they can be secured; also the best arrangement of equipment and its proper installation. The course includes lectures, recitations, discussions, readings and written reports.

MANUAL TRAINING FOR PRIMARY GRADES. Laboratory, twelve hours. Two credits. Professor Bray and Mr. Parker.

This course is designed to give instruction to teachers in those forms of hand work that have been found most profitable in the lower grades. The possibilities and adaptations of the different mediums are studied and methods of teaching the work are carefully considered. This work includes weaving, cord work, raffia, reed work, cardboard construction, and elementary tool work. Instruction is by means of lectures, discussions and reports.

SHOP PRACTICE

Instructor LYNCH
Assistant PARKER
Assistant BALL
Assistant YOST

WOODWORKING FOR GRAMMAR GRADES. Laboratory, twelve hours. Two credits. Assistant Parker.

This course is for teachers who are preparing for the teaching of woodwork for the grammar grades. Suitable, carefully selected exercises are given so that the principles of the work can be more easily learned. The assignment and reference work calls for written reports on assigned subjects that bear closely upon the laboratory work. This very materially strengthens the course by reinforcing the shop work with book work.

WOODWORKING FOR THE HIGH SCHOOLS. Laboratory, twelve hours. Two credits. Assistant Parker.

This course is suitable for the teacher of woodworking for high schools. In it a number of the most important exercises in joinery are carried out with a study of their application, after which a series of articles in practical elementary cabinet construction is made, and the proper methods of finishing the same are studied. The common varieties of wood are collected and studied. The assignment and reference work covers the subjects taken up in the laboratory, with considerable emphasis upon methods of staining, filling, waxing, varnishing and finishing the various woods. A careful study is made also of the method of staining, filling, waxing, varnishing and rubbing the articles constructed. Considerable emphasis is laid upon the proper use and care of tools and machines.

ADVANCED WOODWORKING. Laboratory, twelve hours. Two credits. Assistant Ball.

This is a continuation of Woodworking I for the high schools, with advanced work in cabinet construction by the use of the woodworking machinery, and such bench work as is necessary. Special emphasis is placed upon the quantity as well as the quality of the work, in order that a proper use may be made of time. The assignments cover woodworking machinery, tools and sharpening and the drawing up of a completely equipped woodworking shop.

WOOD TURNING. Laboratory, twelve hours. Two credits. Assistant Ball.

This course is designed to prepare teachers for teaching woodturning in high schools. The work includes typical application of tools and processes, in turning between centers, on faceplates, and by means of hollow chucks. Exercises are given in turning cylinders, cones, beads, convex and concave surfaces, after which articles are made from drawings which have a practical application in a student's home or social life, such as handles, mallets, rolling pins, circular boxes with covers, Indian clubs, dumb-bells, napkin rings, bowls, towel rings, typical vase forms, cups, goblets, frames, ornamental stools, etc. While many of these articles are made from blue prints, it is the aim to have the student make some object of value from his own design, both as a project in turning and as a practical lesson in designing. The assignment work covers a study of the commercial value of woodturning, methods of polishing and finishing woods in the lathe, together with problems on power transmission, shafting, belting, speeds, etc.

FORGING I. Laboratory, twelve hours. Two credits. Instructor Lynch.

In this course the field of hand-forging as related to high school is covered. The work includes practical exercises in making articles of use, which involve the operations of drawing, upsetting, welding, twisting, splitting and shaping. Sufficient instruction is given the student in the forging of tool steel to enable him to make and temper many of the tools that are needed in this and other branches of manual training in the high school. The assignment and reference work consists of a study of forging materials, equipment, supplies, etc.

FORGING II. Laboratory, twelve hours. Two credits. Instructor Lynch.

Advanced work is given in the forging of iron and in the manufacture of tools, such as punches, chisels, drills, scrapers and hammers. Instruction is given in the proper methods of heating, forging, hardening, tempering, annealing and working the various kinds of tool steel and in the case hardening of mild steel. The assignment and reference work consists of a study of the theory of hardening and heat treatment of the various steels; together with a study of equipment and shop layouts.

FORGING III. Laboratory, twelve hours. Two credits. Instructor Lynch.

Special work is given in the forging of iron and steel to impart skill in the different operations. Some practice is given in the making of ornamental iron work.

MACHINE TOOL WORK I. Laboratory, twelve hours. Two credits. Assistant Yost.

This course includes both bench and machine tool work, in which practice is given in chipping, filing, shaper and planer work, scraping, drilling, cutting, right- and left-hand and multiple threads, and knurling on the lathe. Practically all of the work is upon parts of machines that are being built in the shops. Assignments and reports upon the tools and equipment used in the laboratory work are an important feature of the course.

MACHINE TOOL WORK II. Laboratory, twelve hours. Two credits. Assistant Yost.

This course consists of progressive problems in turning and calipering, boring, reaming and taper turning and threading on the lathe, exercises in chucking, the use of forming tools, practice on the key-seating machine, and the making of a spur gear on the milling machine. Assignments and reports are given on cutting edges, tool adjustments, cutting speeds and feeds, and on equipment used in the laboratory work.

MACHINE TOOL WORK III. Laboratory, twelve hours. Two credits. Assistant Yost.

This course takes up work on the turret lathe and boring mill; lacings, and methods of belt connections, compound and differential indexing and the cutting of spiral gears on the milling machine. Assignments are given and reports required on rapid methods of production, jigs, templets, gages, accurate methods of making measurements and modern rapid productive machine tools.

STEAM AND GAS ENGINEERING

Assistant BUCK

FARM MOTORS A-I. Lectures and recitations, three hours; laboratory practice, six hours. Two credits.

This course is designed to teach the operation, care and repair of stationary gas engines, oil engines and steam engines. Some time is also devoted to automobile details, including automobile motors, carburetors, transmission systems, differentials, clutches and starting systems.

FARM MOTORS A-II. Lectures and recitations, three hours; laboratory practice, six hours. Two credits. Prerequisite: Farm Motors A-I.

A study is made of the selection, care and repair of traction engines.

GAS ENGINES AND TRACTION ENGINES. Lectures and recitations, three hours; laboratory practice, six hours. Two credits in the School of Agriculture; no College credit.

Gas engines and gas traction engines are studied as to their construction, operation and care.

Division of Home Economics

MARY PIERCE VAN ZILE, *Dean*

DOMESTIC ART

Professor BIRDSALL
Assistant FRENCH
Assistant LAWSING.

CLOTHING I. Laboratory, eighteen hours. Three credits. Assistant French.

This course includes practice in hand and machine sewing; exercises in patching, darning, mending, and repair of clothing; drafting and use of patterns. These principles are applied to the making of undergarments and a shirt waist. The keeping of a note book is an important part of the course.

DRAFTING AND PATTERN MAKING. Laboratory, twelve hours. Two credits. Prerequisite: Clothing I. Assistant French.

This course begins with crinoline modeling, establishing the principal lines for measurement and developing an appreciation of the relation of the lines of pattern to different forms. All foundation patterns are drafted to measure and fitted; designs are worked out upon the paper patterns and upon forms without the use of patterns, using cheesecloth or other soft material for draping. Note book work is required.

MILLINERY. Laboratory, twelve hours. Two credits. Prerequisite: Clothing I, or the equivalent. Professor Birdsall.

This course includes practical and artistic principles of millinery, preparing various materials for trimmings; practice in making bows, ro-

settes, and other forms of hat decoration; making wire and buckram frames; use of velvet, silk and straw; renovating and use of old material.

COSTUME DESIGN. Class work, three hours; laboratory, twelve hours. Three credits. Prerequisite: Color and Design. Assistant Lawsing.

This course includes a study of the principles of design, color harmony, and the application of art in dress; original problems and their direct application to designs for textiles, embroideries, and costumes; costumes in pencil, pen, ink and water color; costumes for reproduction in materials in direct relation to dressmaking.

CLOTHING II. Laboratory, eighteen hours. Three credits. Prerequisite: Clothing I or the equivalent. Professor Birdsall.

This course includes demonstrations and the cutting and making of a simple lingerie dress; a coat suit of either linen or cotton material.

DOMESTIC SCIENCE

Associate Professor SCHERMERHORN
Assistant Professor SHEETS
Instructor COX
Instructor KENNEDY
Assistant BARTHOLOMEW

DIETETICS. Class work, three hours; laboratory, twelve hours. Three credits. Prerequisites: Foods I, II and III and Human Nutrition. Open to those whose previous training in foods and chemistry is satisfactory to the instructor in charge. Assistant Professor Sheets.

This course is an application of the principles of human nutrition as applied to the feeding of individual under physiological and economic conditions. Lectures are given and reference work is required.

Laboratory.—Planning and serving of dietaries under the various physiological and economic conditions furnish the work in the laboratory.

HOME NURSING. Class work, seven and one-half hours. Three credits. Prerequisites: Household Microbiology I and II. Instructor Kennedy.

This course includes the home care of the sick, first-aid treatment, and the prevention of diseases.

SANITATION AND PUBLIC HEALTH. Class work, seven and one-half hours. Three credits. Prerequisites. Instructor Kennedy.

This course includes a study of conditions which determine the healthfulness of the house and the application of principles of sanitation to its care. Public-health movements in relation to the home are investigated and relation of home sanitation to the community emphasized. Lectures are given and reference work is required.

HOUSEHOLD ADMINISTRATION. Class work, seven and one-half hours. Three credits. Assistant Bartholomew.

This course has been arranged for the purpose of providing instruction in the problems and technical procedures of the modern household. Such topics as the following are discussed, both from the ideal and practical standpoint; the organization of the household; the choice of a home and its furnishings; income as determining the type of a household; the budget and its apportionment; household accounts; household service; apportionment of time; motion studies as applied to household activities; home life and its standards. There are lectures and class discussions, and reference work is required.

MARKETING AND SERVING. Laboratory, eighteen hours. Three credits. Prerequisites: Dietetics. Elective for those whose previous training is satisfactory to the instructor in charge. Instructor Cox.

This course gives an opportunity for practice in home cookery. It includes the planning, preparation and serving of meals based upon dietetic and economic standards.

FOOD PREPARATION. Laboratory, twelve hours. Two credits. Associate Professor Schermerhorn.

This course includes a study of food principles in relation to their composition, source, and value in the body.

ADVANCED FOOD PREPARATION. Class work, three hours; laboratory, six hours. Two credits. Assistant Professor Sheets.

This course is planned to give practice in preservation of food, and in the principles of meal planning and serving.

HOME PROBLEMS. Class work, five hours; laboratory, six hours. Three credits. Assistant Bartholomew.

This course provides instruction and practice in the processes essential to the care of the house. Among the subjects studied are cleaning processes, the laundry, marketing, choice and care of utensils, the organization for work, and the social life of the home.

Laboratory.—Principles underlying methods of doing the work of the household are illustrated by demonstration and experimental work with cleaning agents, etc.

FANCY COOKERY. Laboratory, twelve hours. Two credits. Instructor Cox.

This course applies the principles taught in Foods I, II and III to fancy dishes and gives practice to further develop skill in manipulation.

HOME ART

Assistant Professor HOLMAN.
Assistant LAWSING.

COLOR AND DESIGN. Laboratory, twelve hours. Two credits. Assistant Lawsing.

Colors are studied with reference to value, hue and intensity. Color harmonies and design principles are developed and adapted to objects constructed of paper, cloth and leather.

HOME DECORATION. Studio work, eighteen hours. Three credits. Prerequisite: Color Design. Assistant Professor Holman.

This is a study of color, form, and arrangement of home furnishings. Wall coverings, carpets, pictures, furniture, etc., are discussed and studied so that the student may recognize and appreciate what is appropriate and beautiful.

PUBLIC SCHOOL DRAWING. Laboratory, twelve hours. Two credits. Assistant Professor Holman.

This course presents representation, color, design, construction work and picture study for rural and grade schools.

Division of General ScienceJ. T. WILLARD, *Dean***ATHLETICS AND PHYSICAL EDUCATION**Professor CLEVINGER.
Assistant Professor CAHOON.**COURSES FOR MEN**

Courses for men are designed primarily to instruct men who desire expert, practical knowledge of the best methods of coaching football, base ball, basket ball, and track and field athletics. These courses should appeal strongly to men who plan to take up coaching as well as men already engaged in coaching in high schools and colleges.

These courses will be conducted by lectures and by practical demonstrations.

Throughout all the courses, lectures and demonstrations will be given on the care and prevention of injuries, how to guard against injuries, how to care for them, and the best methods of bandaging sprains and weak joints.

FOOTBALL. Lectures and recitations, two and one-half hours; field and demonstration work, four hours. One and two-thirds credits. Professor Clevenger.

This course covers the following phases: spirit of the game, discussion of the rules, tackling the dummy, charging sled, defense in general, line defense, secondary defense, kick-off, punting, place kicking, drop kicking, direct pass plays, systems of offense in general, quarterback pass plays, interference, signals, training, and equipment.

BASKET BALL. Lectures and recitations, two hours; floor and demonstration work, two and one-half hours. One and one-third credits. Professor Clevenger.

The work covers the discussion of the rules, technique of basket shooting, foul throwing, catching and passing, dribbling, reverse turn, different styles of play, offense, defense, team work, selection of players, training and equipment.

BASEBALL. Lectures and recitations, two and one-half hours; field and demonstration work, three hours. One and one-half credits. Professor Clevenger.

The course covers the discussion of the rules, fielding, batting, bunting, base running, sliding, team work, pitching, catching, proper way to play each position, indoor and outdoor practice methods, coaching, signals, training and equipment.

TRACK AND FIELD SPORTS. Lectures and recitations, two and one-half hours; field and demonstration work, three hours. One and one-half credits. Professor Clevenger.

The course includes the discussion of the rules, starting, sprinting, distance running, hurdling, jumping, vaulting, shot putting, discus throwing, javelin throwing, training, dieting, and equipment.

COURSES FOR WOMEN

GYMNASTICS. Lectures and recitations, one and one-half hours; practical work, three hours. One credit. Assistant Professor Cahoon.

This course is especially planned for the needs of the teacher in the public school where no special teacher in this subject is employed. Lectures are given on the general theory of gymnastics and the physiological reason for each exercise. A note book is required.

Practical work.—The practical work includes free exercises, hand apparatus, heavy apparatus, and practice teaching.

FOLK DANCING. Lectures and recitations, one hour; practical work, four hours. One credit. Assistant Professor Cahoon.

Lectures are given on the physiological benefit derived from the dances, in costuming and in the use of the dances in festivals and fetes. A note book is required.

Practical work.—This course offers graded folk dances of the different nations, suitable for use in schoolrooms, playgrounds, or gymnasiums.

GAMES. Lectures and recitations, one hour; practical work, four hours. One credit. Assistant Professor Cahoon.

Lectures are given on the problems of grading games, and on the physiological benefits received. A note book is required.

Practical work.—This course offers practice in games for grammar schools, high schools, playgrounds and gymnasiums.

ESTHETIC DANCING. Practical work, three hours. One-half credit. Assistant Professor Cahoon.

Practical work.—This is a class for beginners. Technique and simple esthetic dances are taught. No exercise gives better training in muscle control, poise and good carriage than does esthetic dancing.

TECHNIQUE OF BASKET BALL, BASEBALL AND HOCKEY. Lectures and recitations, two hours. Two-thirds credit. Assistant Professor Cahoon.

This course is devoted to the technique of these sports, the physiological benefit derived, and the organization of each into interclass contests.

FIRST AID TO THE INJURED. Lectures and recitations, one hour. One-third credit. Assistant Professor Cahoon.

This course includes lectures in the use of remedial measures to be employed before the doctor comes, and in a few simple laws of health and nursing. Practical work is given in bandaging, artificial respiration, transportation of the wounded, etc.

SWIMMING. Five hours. No credit. Assistant Professor Cahoon.

BACTERIOLOGY

Assistant GLASGOW

GENERAL BACTERIOLOGY. Class work, five hours; laboratory, six hours. Three credits.

The course is designed primarily for teachers and is not equivalent to the regular College course, as no prerequisite (Organic Chemistry) is required and the work given is less technical than in case of the regular course.

This course consists of a general survey of the subject of bacteriology as related to agriculture, sanitation, the preparation and care of food, etc. Some attention is also given to the method of isolation, cultivation and study of micro-organisms. The student becomes somewhat familiar with methods used in the bacteriological analysis of water, milk, etc.; sterilization, sources and modes of infection by pathogenic bacteria and means of controlling their distribution.

BOTANY

Professor ROBERTS
Assistant KIRKBRIDE

FIELD BOTANY. Class work, three hours; field and laboratory work, twelve hours. Three credits. Professor Roberts.

It is the especial purpose of this course to offer teachers an opportunity to become acquainted with the nature of plants in the field, their natural history, habits, their distribution, and their relation to their environment, in what are known as "plant societies." Excursions are made to definite localities near Manhattan, for the study of the plants of the prairies, woods, sandhills, swamps and streams. Sufficient practice work is also given in the identification of plants to enable an intelligent person to proceed further on his own account. Text: Gray's *Manual of Botany*, seventh edition (preferably the leather-bound edition for pocket use).

BOTANY FOR HIGH-SCHOOL TEACHERS. Class and laboratory, fifteen hours. Three credits for entrance or in the School of Agriculture. Assistant Kirkbride.

The purpose of this course is to give high-school teachers a method of teaching botany that will bring the subject into closer relation to the farm and its problems. It is an attempt to render possible the study of botany in a scientific sense, but by the use, so far as practicable, of strictly economic plants for laboratory material. Considerable emphasis is laid on the study of plants from the natural-history standpoint. Most of the larger and more important groups of plants are studied from this point of view. This course falls into the following divisions: (1) The plant and its work, two weeks; (2) the kinds of plants, one week; (3) the diseases of plants, one week; (4) weeds and their eradication, one week; (5) the improvement of plants, one week. Text: Bergen and Caldwell's *Practical Botany*.

PLANT BREEDING. Class and laboratory, fifteen hours. Three credits. Professor Roberts.

This course is intended especially as a practical course for teachers who wish to introduce work in plant breeding into schools and home gardens. A survey is given of the work that has been accomplished in the improvement of plants, and of the methods that have been followed by the breeders. Considerable time is devoted to practical work in the selection of plants for pedigree-breeding purposes, to the hybridization of plants, and to the study of the field and greenhouse methods and technique used in breeding of agricultural, horticultural, and ornamental plants. The material used for study includes, so far as the season will permit, ornamental flowering plants, orchard and fruit plants, and agricultural field plants. Enough of the fundamental and underlying principles of plant genetics is given to make the practical work intelligible. Text: Bailey's *Plant Breeding* (new edition). Lectures and syllabi are furnished by the department in addition.

GENERAL BOTANY. Class and laboratory work, fifteen hours. Three credits. Assistant Kirkbride.

This is a general introduction to botany. A careful study is made of the morphology of the chief great groups of plants, of their elementary physiology and ecology, of the classification and geographic distribution of the plant kingdom, and its economic relation to man. Text: *Nature and Development of Plants*, by C. C. Curtis.

Laboratory.—The aim of the laboratory work in this course is to give as thorough a study as may be of the morphology of the chief important groups in the plant kingdom, taken in the order of their relative complexity, and of their probable relation to one another as parts of an evolutionary series. Laboratory outlines are furnished by the department.

CHEMISTRY

Associate Professor KING
Assistant Professor BRUBAKER
Assistant Professor HUGHES
Instructor GUTSCHE

CHEMISTRY I. Lectures and recitations, seven and a half hours; laboratory, twelve hours. Five credits. Associate Professor King.

This term's work begins the study of inorganic chemistry, and is designed, with the succeeding terms, to give the student a knowledge of the fundamental principles of chemistry. As all subsequent progress in this science requires a working knowledge of its principal theoretical conceptions, the principles of nomenclature, the significance of formulas, chemical equations, etc., much attention is given these, while at the same time the practical uses of the substances, and the processes used in metallurgy, engineering, agriculture, and other arts are emphasized. McPherson and Henderson's *A Course in General Chemistry* is used as a textbook, this term's work covering the nonmetals. The text is supplemented by lectures and is amply illustrated by experimental demonstrations.

Laboratory.—As far as time permits, the student performs independently experiments touching the preparation and properties of the more important principles, and the student is required, as far as possible, to study experiments in that light. *Laboratory Exercises in Elementary Chemistry*, by William McPherson, is used as the laboratory guide.

CHEMISTRY H-II. Lectures and recitations, five hours; laboratory, eight hours. Three and a third credits. Associate Professor King and Assistant Professor Brubaker.

The work under this head is a continuation of the course in Chemistry I as taught in 1916. It includes a study of sulphur, selenium, tellurium, the chlorine family, carbon, silicon, boron, phosphorus, and their compounds, and additional important theoretical matters such as equilibrium, classification of the elements, molecular weights and thermochemistry. The textbook used is McPherson and Henderson's *A Course in General Chemistry*.

Laboratory.—The laboratory work is a suitable accompaniment of the lectures and recitations, the *Laboratory Exercises in Elementary Chemistry* by William McPherson being used as the guide.

CHEMISTRY H-III. Lectures and recitations, three hours; laboratory, ten hours. Two and two-thirds credits. Instructor Gutsche.

This course completes the course in freshman chemistry as taught in 1916-'17, and covers the metals and their compounds as treated in McPherson and Henderson's *A Course in General Chemistry*.

Laboratory.—The laboratory work deals chiefly with the metals and their compounds.

QUALITATIVE ANALYSIS. Lectures and recitations, three hours; laboratory, ten hours. Two and two-thirds credits. Instructor Gutsche.

In this course the prime object is to increase the student's knowledge of chemistry as a whole. The standard methods of analytical chemistry are made the basis of a systematic study of the chemical properties of the most important metals, nonmetals, acids, bases and salts. The teaching of analysis as such is a secondary object, although the student is held to the exact observation and careful reasoning required in ascertaining the composition of single substances and mixtures. The theories of chemistry receive constant application. The effect of the course is to broaden, strengthen, and unify the student's ideas of general chemistry, to enlarge greatly his knowledge of chemical facts, and at the same time to fix many of them in his mind by associating them with reactions made use of in analytical processes.

Laboratory.—The regular methods of qualitative analysis serve as a basis for a laboratory study of the chemical properties of substances. Laboratory manual, *Qualitative Analysis*, by W. A. Noyes.

ORGANIC CHEMISTRY H. Lectures and recitations, seven and a half hours; laboratory, six hours. Four credits. The lectures and recitations may be taken without the laboratory, but this is not recommended. Assistant Professor Hughes.

A systematic study is made of the simple examples of the more important classes of organic compounds in their logical chemical relations. Such substances as touch the everyday affairs of life are treated in greater detail. Opportunity is thus afforded to consider the hydrocarbons, alcohols, organic acids, fats, soaps, sugars, starch, proteins, and other less-known substances. Compounds used for clothing, food, fuel, light, antiseptics, disinfectants, anesthetics, poisons, medicines, solvents, etc., are included. While especial attention is given to the useful organic compounds, the study of others is not excluded, when they contribute to an understanding of the systematic relations existing among the several groups.

Laboratory.—The laboratory work includes experiments and preparations touching organic substances largely employed in the household, especially fats, carbohydrates and proteins.

HOUSEHOLD CHEMISTRY. Lectures and recitations, two hours; laboratory, twelve hours. Two and two-thirds credits. Assistant Professor Brubaker.

This course is designed to give the women in the course in Home Economics qualitative and quantitative work in the chemistry of the materials most intimately related to their daily life. Air, water, foods, fuel, fabrics, disinfectants, metals, and other materials used in and about the home are the subjects of numerous experiments touching their properties, usefulness and defects.

QUANTITATIVE ANALYSIS I. Laboratory, eight hours. One and a third credits. Instructor Gutsche.

This consists of simple quantitative exercises, which are planned to give the student a knowledge of the simpler operations in quantitative analysis, as well as to lay the foundation for studies in which such knowledge is required. Quantitative analysis is at the basis of many investigations connected with agriculture and the course is designed not only to increase the student's knowledge of chemistry, but to give him an appreciation of the value of exact quantitative work. Textbook: *Quantitative Chemical Analysis*, by Frank and Clemans.

ECONOMICS

Professor KAMMEYER

ECONOMICS. Seven and a half hours. Three credits.

This is a course in the fundamentals of economic science, including a study of man's wealth-getting and wealth-using activities as they manifest themselves in the consumption, production, exchange, and distribution of commodities and services. Budgets, factors and expenses of production, money, banking, wage systems, labor organizations, rent, interest and profits are some of the leading topics for study and class discussion. These phenomena are here studied in conjunction with the laws or social conventions which control or influence them, such as the federal-reserve systems, the farm-loan act, legal restrictions concerning commerce, strikes, child labor, trusts, monopolies and the like. The application of economic principles to such subjects as taxation, socialism, insurance, etc., are also considered. Ely's *Outlines of Economics* (1916 revision) is used as a class manual. Supplementary reading of current literature,

reference books, the keeping of notes, and periodical written reports are required. A combination of the textbook and lecture method is followed.

SOCIOLOGY. Seven and one-half hours. Three credits.

This course deals with social life in general, involving a study of social origins, activities, and organization. Such social institutions as the family, the state, the church and the school are studied as to origin, development, organization and aims. The processes of socialization, social forces, and social control particularly as they manifest themselves in rural life receive special emphasis. Consideration is given also to social pathology; poverty, its causes and remedies; crime, its causes and prevention; and to remedial legislation and correctional agencies. The aim of the course is to help the student to get his social bearings and to find himself as a fact and factor in the complex interrelations of human society. Blackmar and Gillan's *Outlines of Sociology* is used as a text. Assigned library readings and special written reports are required. Instruction is by recitation, class discussion and lectures.

EDUCATION

Professor HAWKINS
Professor SWIFT
Associate Professor KENT
Associate Professor SCHERMERHORN
Assistant Professor DUNN

PSYCHOLOGY. Seven and one-half hours. Three credits. Assistant Professor Dunn.

A general introduction is here given to the forms and laws of conscious experience as based on a knowledge of the physiological conditions of mental life. The work of the course includes the study of a text, outside readings, lectures and class experiments.

PRINCIPLES OF EDUCATION. Seven and one-half hours. Three credits. Professor Swift.

Taking the purpose of education to be the preparation of the child for efficient participation in the life of society, the course aims at presenting the biological, psychological, economic, cultural and moral aspects of the educative process. Prerequisites: Psychology, History of Education.

TEACHING METHOD. Seven and one-half hours. Three credits. Professor Swift.

The aim of this course is the development of good classroom technique through detailed study of child experiences as related to the larger demands of education. The work includes lectures, library assignments and observation of classes. A feature of the course is individual reports and discussions. Prerequisite: Psychology.

EDUCATIONAL ADMINISTRATION. Seven and one-half hours. Three credits. Associate Professor Kent.

This course is a study of the organization of state, city and county schools; the interrelation of boards of education, superintendents, principals, teachers. The school of law of Kansas is also studied.

HISTORY OF EDUCATION. Seven and one-half hours. Three credits. Assistant Professor Dunn.

This course is intended to present the successive relationships that have existed between educational machinery and practices and the changing political, economic, scientific, cultural, and ideal environments from primitive times to the present.

HOME ECONOMICS EDUCATION. Seven and one-half hours. Three credits. Associate Professor Schermerhorn.

This course considers problems dealing with the place of Home Economics in modern secondary education; the aims and phases of work in

various types of schools; the organization, maintenance, equipment and supervision of such departments. Prerequisite: Educational Administration.

INDUSTRIAL EDUCATION. Seven and one-half hours. Three credits. Associate Professor Kent.

This course is a study of typical secondary schools of industrial education and departments of industrial education in public schools; of the industrial schools of Germany; of the making of a course of study in industrial education for elementary and secondary schools; of shop equipment and cost of the pedagogy of vocational subjects. Prerequisite: Educational Administration.

AGRICULTURAL EDUCATION. Five hours. Two credits. Professor Hawkins.

A comparative study is made of the provisions for agricultural education in this and other states and countries and the principles underlying such education. The part played in agricultural education by community, county, state and nation is discussed. Types of schools, courses of study, adjustment of school work to community needs, and the equipment and administration of agricultural schools are studied. The aim of the course is to fit the student to plan, teach and administer or supervise agricultural work, especially in high schools. Prerequisite: Educational Administration.

TEACHING METHODS IN AGRICULTURE. Seven and one-half hours. Three credits. Professor Hawkins.

Training in planning lessons, organizing materials, and conducting class and laboratory work in agriculture is the purpose of this course. The work will include observation, criticism and reports of class exercises, a study of work done in high schools, and the making and criticism of lesson plans and outlines. Special attention is given to selecting laboratory materials, conducting laboratory exercises, and adapting class and laboratory work to each other. Prerequisite: Teaching Method.

SEMINAR IN AGRICULTURAL EDUCATION. Three hours. Two credits. Professor Hawkins.

This course is designed for superintendents, principals and college and high-school teachers of agriculture. It consists of lectures, reports and class discussions on topics of agricultural education. Each member of the seminar is expected to choose a topic early in the term for special investigation and to embody the results of the investigation in a paper. Prerequisites: Psychology and Educational Administration.

ENGLISH

Professor MACARTHUR
Associate Professor DAVIS
Assistant Professor RICE

ENGLISH LITERATURE FOR HIGH SCHOOL TEACHERS. Seven and one-half hours. Three credits. Professor Macarthur.

This course is intended especially for those teaching or desiring to teach English literature in the high school. The class work consists not only of lectures by the instructor, the interpretation of the works assigned for study, and the writing of critical essays, but of systematic discussion of methods for presenting the classics to the pupils in the high school and of awakening in them a warm, vital appreciation of the best literature.

LITERATURE FROM THE READERS. Seven and one-half hours. Three credits. Assistant Professor Rice.

This course is planned to meet the needs of teachers of rural and grade schools. The aim of the course is to stimulate the teacher's love

for good literature until she becomes conscious of her power to interest, impress and inspire boys and girls. Reading is considered both as a fundamental means of acquiring knowledge and as a stepping-stone to the appreciation of the world's best literature. Special emphasis is placed upon teaching children how to study the reading lesson, and upon the necessity to use in the reading lessons more of the literature of rural life. One hour each week is devoted to special methods of teaching reading.

ENGLISH COMPOSITION FOR HIGH SCHOOL TEACHERS. Seven and one-half hours. Three credits. Associate Professor Davis.

This is a new course aiming to do for teachers of English composition in the high school what the preceding course does for teachers of literature. Both courses consider particularly the needs of the teacher who has had special training in home economics, agriculture, manual training, or general science, but who has not had such training in English. A definite program of work for the high-school year is constructed and discussed. The best conduct of composition work under the conditions met in the rural and smaller high school receives special consideration.

COLLEGE RHETORIC. Seven and one-half hours. Three credits. Professor Macarthur.

This course consists of a rapid review of the principles of sentence structure, outlining, and paragraphing, followed by a study of the elements of effective writing in prose. In connection with the course systematic training is given in the writing of expository themes.

ENGLISH LITERATURE. Seven and one-half hours. Three credits. Assistant Professor Rice.

This course consists of a general survey of English Literature. Lectures are given on the history of English literature from the earliest times to the present day. In addition, works of representative authors of each period are assigned for reading outside of the classroom. These are discussed in class and passages from them interpreted.

BUSINESS ENGLISH. Seven and one-half hours. Three credits. Associate Professor Davis.

This course comprises a thorough review of business letter-writing, exercises in writing contracts, notes, mortgages, wills, orders, sale bills, specifications, model story advertisements, and a practical study of other forms commonly used in connection with business.

ENTOMOLOGY

Assistant Professor TANQUARY

GENERAL ENTOMOLOGY. Class work, five hours; laboratory, six hours. Three credits. Prerequisites: General Zoölogy I and II, or equivalent.

This is a study of the elementary anatomy and physiology of insects, complete enough to give a thorough understanding of the life history and habits of the most important species, and the general principles upon which the control of these economic forms is based. It is a study of the more important general facts about insects as a class; the main characters of the different orders and groups; how they become fitted to survive and multiply; and how the structure and habits of one group render it susceptible to certain measures of control, while in other groups entirely different measures are necessary. The class work consists of lectures and of text and special reference study. Field work forms a limited part of the course.

HOUSEHOLD ENTOMOLOGY. Class work, five hours. Two credits. Prerequisites: General Zoölogy I and II, or equivalent.

This is a study of the elementary structure and physiology of insects complete enough to give a clear understanding of the life history, habits and methods of control of the principal insects injurious to house, garden, lawn, and human health. The course consists of reference study and a series of lectures.

GERMAN

Professor CORTELYOU

ELEMENTARY GERMAN II. Seven and a half hours. Three credits.

Noun classes are reviewed rapidly. The following new material is studied: the strong conjugation, pronouns, prepositions, the subjunctive mode, modal auxiliaries, reflexive verbs, and the passive voice. Essential facts of grammar are insisted upon, but German is taught as a living language. Conversational exercises in German and written translation from English into German are frequent. Text: Vos's *Essentials of German* (page 133 to the end).

GERMAN READINGS. Seven and a half hours. Three credits.

This course embraces readings of dialogue selections which deal in detail with German life, customs, history, and mythology. A few of the best and most popular song poems also are studied. Grammatical drill is continued, with occasional sight readings and translations into German. Conversations are based on the readings. The student learns to read and write the German script. Text: Bacon's *Im Vaterland*.

GERMAN SHORT STORIES. Seven and a half hours. Three credits.

The material read in this course comprises a number of short stories of considerable interest by such modern authors as Auerbach, Niese, Goldhammer, La Roche, Leander, Scheffel, and Polenz. Sight translations from German into English and English into German combined with German conversation complete the work of the course. Text: Baker's *German Stories*.

HISTORY AND CIVICS

Professor PRICE
Associate Professor ILES
Assistant Professor JAMES
Instructor REYNOLDS

AMERICAN HISTORY I (BEGINNING OF THE AMERICAN NATION). Seven and a half hours. Three credits. Professor Price.

This course gives special emphasis to the industrial phases of the origin and development of the American nation to the end of the War of 1812. It includes our constitutional and political development, especially with reference to origin, basis, cause, and effect. It aims to develop historic-mindedness; that is, training the student to put himself in the other fellow's place and understand fairly "the why." The European origin and background of American history; the evolution of colonial life, industries, and institutions; why we became an independent nation; our westward expansion; the establishing of nationality; and the development of government by the people, are phases definitely emphasized. Lectures, readings and recitations.

AMERICAN HISTORY II (WESTWARD EXPANSION). Seven and a half hours. Three credits. Professor Price.

This course begins with an examination of the conditions in America at the close of the War of 1812, and takes up a study of the issues and leaders of the middle period. It includes a special study of the influence of the West on our American institutions and industries, politics, and government, and how these influenced not only the East but even Europe.

The growth of the slavery issue, and the development of sectionalism, territorialism, territorial expansion, the evolution of parties, and a special study of the early history of Kansas bring the course down to the Civil War. Instruction is by lectures, readings and recitations.

This course and the one described above are both based on the *American History Notebook*, approved by the State School Book Commission, and include a thorough consideration of the State texts, James and Sanford's *American History*, Foster's *History of the United States*, and Arnold's *History of Kansas*.

AMERICAN GOVERNMENT. Seven and a half hours. Three credits. Associate Professor Iles.

This is a course in government and politics, with especial reference to the actual operation of local, state and national political machinery, and the newer devices for securing a more effective popular control, such as the direct primary, initiative, referendum, short ballot, and recall. A comparative study of the constitution and government of Kansas is supplemented by a discussion of the present tendencies in legislation and administration. Recitations, lectures, assigned readings. Text: Beard's *American Government and Politics*.

TEACHERS' COURSE IN HISTORY. Seven and a half hours. Three credits. Associate Professor Iles.

This is a seminar course of discussions based on Henry Johnson's new book, *Teaching of History in Elementary and Secondary Schools*, together with Mace's revised work, *Method in History*, and supplemented by a study of the Report of the Committee of Seven, and of the Committee of Five in History in the Secondary Schools, and the Committee of Eight on History in the Elementary Schools. A critical examination is made of special books on method in history and civics, such as Wayland's *How to Teach American History*, and of special articles in the *History Teachers' Magazine*. The different texts in history and civics are critically investigated as to points of excellence or weakness, including lectures on the content or viewpoint of each. Information is also given as to the best illustrative material and helps in the teaching of history and civics. This course reveals the evolution in the writing of history, and the growing importance of history and civics in the modern school curriculum, together with the improving viewpoint as to content of both the history and the civics courses.

ENGLISH HISTORY. Seven and a half hours. Three credits. Assistant Professor James.

A survey is made of the whole field, with special emphasis on the modern period, and on the industrial phases of the life of the people. The Tudor and Stuart regimes, with their bearings on constitutional development and New World history; the growth and organizations of the empire, and recent political, social, and industrial advances will be studied in detail. The course is based on Cheyney's *Short History of England* as a text, with lectures and assigned readings.

CIVICS. Seven and a half hours. Three credits in the School of Agriculture, or one-half unit for college entrance. Assistant Professor James.

This course emphasizes the functions rather than the structure of government, and gives special attention to Kansas. It is designed to meet the needs of teachers of civics in grammar schools and in high school, and of those preparing for college. Specific attention is given in this course to community civics for rural districts in an effort clearly to understand rural government and rural problems and definitely to appreciate the opportunities open to teachers and other leaders in rural districts. Instruction is by recitations and assigned readings, with constant reference to the state texts, Arnold's *Civics and Citizenship* and Guitteau's *Government and Politics in the United States*, Kansas Edition.

THE ORIENT AND GREECE. Three credits in the School of Agriculture, or the first half unit of Ancient History for College entrance. Instructor Reynolds.

This course traces the story of human progress from its earliest beginnings and its later development in Egypt, Babylonia, Assyria, Persia and Palestine through its expansion westward into the Grecian peninsula. A survey is made of the social, intellectual, and political life of the Grecian world, with special attention to the forces making for the expansion of the Hellenic world and the contribution of the Greeks to later civilization. This course is based on the State texts by Westermann and Robinson and Breasted, and is designed to be definitely helpful to teachers of ancient history both in high school and in the more elementary grades.

THE MODERN WORLD. Seven and a half hours. Three credits in the School of Agriculture, or the last half-unit of modern history for College entrance. Instructor Reynolds.

The State texts are used in this course. The field covered is the latter part of Harding's *New Medieval and Modern History* together with all of Robinson and Beard's *Outlines of European History*, Part II. In keeping with the recent trend of history teaching, the emphasis is placed on the very recent developments, including the great war, and giving special consideration to the industrial phases of the European world.

INDUSTRIAL JOURNALISM AND PRINTING

Professor CRAWFORD
Assistant KEITH

ELEMENTARY JOURNALISM. Five hours. Two credits. This course should be accompanied by Journalism Practice I to give four credits. Professor Crawford.

This course is designed to give the students practical experience in the fundamentals of newspaper work. It is intended to prepare for more advanced courses in journalism or to give necessary training for effective use of the written article in farm bureau, educational, and other vocational activities. Methods of obtaining news of various types, the writing of the lead, and the general style of the news story are carefully considered. The duties of the reporter and the physical, mental, and ethical demands made upon him are briefly presented. Attention is given to the history and scope of journalism.

JOURNALISM PRACTICE I. Twelve hours. Two credits. Professor Crawford.

This course embodies actual practice in journalism, as closely approximated as possible to actual newspaper work. Students are required to gather news, both assigned and unassigned, and to write the stories in the department work room. The College campus is divided into "runs" which the students cover at regular intervals, and assignments are given at specific times as in a newspaper office. The work is adapted to the needs and qualifications of each student.

INDUSTRIAL WRITING. Five hours. Two credits. This course should be accompanied by Journalism Practice II to give four credits. Professor Crawford.

This course applies the principles of journalism to the treatment of industrial subjects, such as are found in agriculture, engineering, home economics, and more general scientific research. The feature story is emphasized, and the demands of newspapers, farm publications, and magazines for this type of writing are analyzed. The use of photographs and other illustrations receive attention. The work of the College and the Experiment Station affords the basis for the study and practice.

JOURNALISM PRACTICE II. Twelve Hours. Two credits. Professor Crawford.

The work is a continuation of Journalism Practice I. It follows closely the work in Industrial Writing and gives abundant actual practice in writing articles on industrial subjects for newspapers, agricultural journals, and magazines.

PRINTING PRACTICE. Twelve hours. Two credits. Assistant Keith.

A study of composition and of general printing-shop practice, including cost-finding, is made in this course. The work is adapted to the needs of those taking it, but is intended particularly for high-school teachers of printing and for those who expect to have editorial supervision of publications, including high-school papers. Lectures are given on such subjects as the history of printing, artistic typographical arrangement, and the use of printing as an aid in the study of spelling, punctuation, and English composition. More advanced work will be given to students prepared for it.

MATHEMATICS

Associate Professor ANDREWS
Associate Professor WHITE
Assistant Professor STRATTON

ALGEBRA III. Seven and a half hours. Three credits. Assistant Professor Stratton.

The quadratic equation, ratio and proportion, variation, arithmetical and geometrical progression are studied in this course. This course also includes a review of simple equations in two and three variables. Text: Hawkes, Luby, and Touton's *First Course in Algebra*.

PLANE GEOMETRY I or II. Seven and a half hours. Three credits. Assistant Professor Stratton.

The material here studied comprises the usual theorems and constructions, including the general properties of plane rectilinear figures, the circle and measurements of angles. Problems and original exercises have an important place in the course. Text: Wentworth and Smith's *Plane and Solid Geometry*.

SOLID GEOMETRY. Seven and a half hours. Three credits. Associate Professor White.

This course comprises the usual theorems and constructions, including the relation of planes and lines in space; the properties and measurements of prisms, pyramids, cylinders, and cones; the sphere and the spherical triangle. The solution of many numerical and original exercises is required and mensuration of surfaces and solids is treated. Text: Wentworth and Smith's *Plane and Solid Geometry*.

PLANE TRIGONOMETRY. Seven and a half hours. Three credits. Associate Professor Andrews.

Measurement of angles, functions of any angle, functions of multiple and submultiple angles, sum and difference formulæ are included in this course. Triangles and trigonometric equations are solved. Text: Palmer and Leigh's *Plane and Spherical Trigonometry*.

ANALYTICAL GEOMETRY. Seven and a half hours. Three credits. Associate Professor White.

Coördinate systems and applications; loci; the straight line, circle, parabola, ellipse, and hyperbola are studied in this course. The subjects included are those usually treated in a first course. Text: Bailey and Wood's *Plane and Solid Analytical Geometry*.

CALCULUS I. Seven and a half hours. Three credits. Associate Professor White.

This course treats of the principles and processes of differentiation of functions of one variable, geometrical and mechanical application of the derivative, maxima and minima and the use of differentials.

CALCULUS II. Seven and a half hours. Three credits. Associate Professor Andrews.

The subject matter of this course includes rates, curvature, indeterminate forms, series; partial differentiation; integral calculus through the technique of integration; simple application to geometry and mechanics.

Integral calculus is applied to problems in geometry and engineering. Integration in two and three variables is included in this course. Text: Granville's *Differential and Integral Calculus*.

TEACHERS' COURSE IN HIGH-SCHOOL MATHEMATICS. Four hours. One and a half credits. Associate Professor Andrews.

This course undertakes an examination of the subject matter and methodology of high-school mathematics. It includes a study of high-school needs and of high-school courses in algebra, geometry, and trigonometry with bibliographies and other sources of assistance in teaching high-school mathematics. The course includes also a study of the mathematical situation of the past decade as regards the high school with present outlook, problems, and purposes. The work proceeds by readings, lectures, and reports. The student should have as a basis of his work Young's *The Teaching of Mathematics*.

TEACHERS' COURSE IN ARITHMETIC. Four hours. One and a half credits. Assistant Professor Stratton.

This is a course for rural and grade teachers and those interested in the applications of arithmetic to the every-day problems of the farm, shop and home. Special attention is given to a study of the sources and the preparation of supplementary problems for schools. Some attention is given also to the history, recent studies and advancements, and approved methods of presenting the subject. Text: Stratton and Remick's *Agricultural Arithmetic*, and Brown and Coffman's *How to Teach Arithmetic*.

MUSIC

Professor WESBROOK
Associate Professor BROWN
Instructor CARLEY
Assistant ABERNETHY

PUBLIC-SCHOOL MUSIC. Five hours. Two credits. Professor Westbrook, Associate Professor Brown.

This course is a general survey of music in public schools from the primary grades through the high school. Methods of presenting music to children in the different stages of development are taught and materials for such work are studied. Suggestions for community music work are also given.

VOICE. Private and class instruction. Professor Westbrook and Instructor Carley.

Classes with four in the class, meeting once each week for one and one-half hour periods, are formed. No credit is granted for this work.

Hours to suit the convenience of students are arranged for those wishing private vocal instruction. For two three-fourth hour private lessons a week one hour credit is given. A fee of \$10 is charged for private vocal lessons.

VIOLIN. Private and class instruction. Associate Professor Brown. This work is organized after the same plan as vocal instruction. Credit of one hour is given for private instruction and a fee of \$10 charged for private work. No credit is given for class work.

PIANO. Private and class instruction. Assistant Abernethy.

This work is organized the same as Voice and Violin and a special piano teacher is in charge. A fee of \$10 is charged for private work.

HARMONY. Five hours. Two credits. Associate Professor Brown.

The course in harmony includes the study of scales and intervals, primary and secondary chords and their inversions, harmonizing given bases and melodies, ear training, the chord of the dominant seventh, and keyboard harmony. Students contemplating teaching music in public schools will find this work invaluable to them as it is the grammar and mathematics of music. At least five must enroll for harmony or the class will not be organized.

MUSICAL HISTORY. Three hours. One credit. Associate Professor Brown.

A brief survey of the primitive development of the art is given, together with special attention to the classical and romantic periods and present-day conditions and tendencies. The work is made especially interesting by use of copious illustrations on the phonograph.

CHORUS. Three hours. Twice a week, one and one-half hour periods. One credit. Professor Wesbrook.

Every student enrolled in the Summer School is urged to sing in the chorus. This work will be the study and public presentation of beautiful choruses.

ORCHESTRA. Three hours. One credit. Associate Professor Brown.

Every individual who plays an orchestral instrument is urged to bring that instrument and play in the Summer School Orchestra. High-grade orchestra music is studied and is presented in public performances.

PHYSICAL EDUCATION

(See Athletics and Physical Education)

PHYSICS

Professor HAMILTON
Assistant Professor FLOYD
Assistant Professor RABURN

GENERAL SCIENCE. Five hours. Two credits; no College credit is given. Assistant Professor Floyd.

This course is intended for those teachers who are required to offer courses in general science in public-school work. The course includes class, laboratory and field work. It is based on such every-day problems as: Water supply, air supply, weather predictions, light supply, prime motors, transportation, crops, and similar problems, with a study of what science in general has done and can do to solve them. Text, to be selected.

INTRODUCTORY PHYSICS. Class work, five hours; laboratory, six hours. Three credits; no College credit given. Assistant Professor Raburn.

This course is designed for those teachers who desire some knowledge of elementary physics and yet have not time to take the three regular courses offered in this subject. The entire subject is covered and some time given to working problems. Simple experiments and demonstrations are given. The course is a good review for those who have had high-school physics. Students who expect to take county examinations for certificates to teach are advised to take this course. Text: Black and Davis's *Physics*.

ELEMENTARY PHYSICS I. (H-I, M-I, A-I.) Class work, six hours; laboratory, four hours. Three semester credits in the School of Agriculture. Prerequisite: Algebra III. Assistant Professor Floyd.

This course is intended to give a general view of mechanics and sound. Special emphasis is placed upon principles which will be met again in later work in the same or other sciences. Text: Black and Davis's *Physics*.

ELEMENTARY PHYSICS II. (H-II, M-II, A-II.) Class work, six hours; laboratory, four hours. Three semester credits in the School of Agriculture. Prerequisite: Elementary Physics I. Assistant Professor Raburn.

This is a continuation of Elementary Physics I and includes a study of magnetism and electricity. The fundamental laws are studied and illustrated and the working principles of many electrical appliances in daily use are made the subject of class discussion.

ELEMENTARY PHYSICS III. (H-III, M-III, A-III.) Class work, six hours; laboratory, four hours. Three semester credits in the School of Agriculture. Prerequisite: Elementary Physics. Assistant Professor Floyd.

In this course the most important laws of both heat and light are discussed, together with numerous illustrations of everyday phenomena. Text: Black and Davis's *Physics*.

TEACHERS' COURSE IN PHYSICS. Class work, six hours; laboratory and library, four hours. Three credits. Assistant Professor Floyd.

The course includes a study of the modern texts, manuals and methods in high-school physics. Students are given an opportunity to help assemble apparatus and to assist in lecture demonstrations, such as lantern, X-ray, manipulation of generator and motor, induction coils, storage cells, spectroscope, nickel-plating, etc. The laboratory includes the usual experiments required in the elementary course in physics. The purpose of the course is to discuss methods best adapted to the presentation of those topics which present special difficulty, to advise methods of illustrating and demonstrating the fundamental principles, and to select from a large number of possible laboratory experiments a list which might be used in any of our high schools of Kansas. This course is intended for those who are either teaching or expecting to teach physics in secondary schools.

HOUSEHOLD PHYSICS. Seven and one-half hours. Three credits. Professor Hamilton.

This is a course of lectures and demonstrations, in which the laws relating to principles involved in appliances of the household are explained and illustrated. The work in heat is based upon thermometry, calorimetry, radiation, absorption, and methods of refrigeration and ventilation. The course includes a study of light with its color phenomena and actinic effects; of some of the optical instruments used in scientific work; a study of electric lighting and illumination, and of the home, including suggestions for the proper use and care of electrical apparatus for the protection of the appliances and of the operator.

ELECTRICITY. (Engineering Physics II or General Physics II.) Class work, seven and one-half hours; laboratory, four hours. Four credits. Professor Hamilton.

This is an advanced course in electricity. It is the same as is required of all engineering and general science students, and gives the student a working knowledge of the units employed in measuring current and of various methods of producing current, and acquaints him with the electrical appliances used in both current production and electrical measurements. The laboratory work includes the work with generators and motors, photometers, lamp tests, spectrometer, and advanced problems in both electrical measurements and light. Text: Kimball's *College Physics*.

HEAT AND LIGHT. (Engineering Physics III or General Physics III.) Class work, seven and one-half hours; laboratory, four hours. Four credits. Professor Hamilton.

This course is required of all engineering and all general science students. The class work is a continuation of the course in Electricity and includes a thorough study of light and heat phenomena. The laboratory work includes many heat and light measurements and the use of accurate instruments for such measurements. Text: Kimball's *College Physics*.

PHOTOGRAPHY. Class work, three hours; laboratory, six hours. Two credits. Professor Hamilton.

The importance of a record of exact details, as shown in photography, makes this work valuable to all scientists. The course gives the student some knowledge of chemical and physical principles involved in the art, as well as practice in making negatives and prints. The lecture and laboratory work deals with: things to be considered in selecting a camera; proper exposure; composition of pictures; proper development of plates; tests of different developers; retouching; reducing and intensifying negatives; printing and mounting; making lantern slides, bromide enlargements, and the prints best adapted for illustrated articles in newspapers and magazines.

PUBLIC SPEAKING

Assistant Professor EMERSON

EXTEMPORE SPEECH I. Five hours. Two credits.

The work of this course consists in the preparation and delivery of short addresses based on prepared outlines. Careful preparation of material is required. The plan of the speech is made in advance, but the choice of language is left for the moment of speaking. Criticisms and points of theory, given by the instructor, supplement the practice work. This course is recommended for practical men and women. Conviction, not entertainment, is the dominant purpose in the course.

PUBLIC-SCHOOL PUBLIC SPEAKING. Three hours. One credit.

This course covers the public-speaking situation in the grades and high schools, and includes practical methods of teaching, with practice work.

DRAMATICS. Three hours. One credit.

This is not an elaborate study of the drama, but aims to give instruction in dramatic presentation. Practice work predominates. Special attention is paid to "home talent" or amateur theatricals, and methods of coaching are suggested. The "Little Country Theater" idea is developed.

HIGH-SCHOOL FORENSICS. Three hours. One credit.

This course, as its name suggests, covers oratory and debating in the high schools, and takes up the following topics: How to write a winning oration; debating, what it is, and how to teach it; training contestants for debates and oratorical contests. Practice work in forensics is given.

ADVANCED PUBLIC SPEAKING. Three hours. One credit.

In this course the work consists of the preparation and delivery by the student of one extended lecture-recital, lecture, or address during the term. This is supplemented by class lectures and practice, and by a study of types. It may include the preparation and delivery of institute talks or of addresses suitable for extension work.

ZOOLOGY

Professor NABOURS

ZOÖLOGY FOR TEACHERS. Class work, three hours; laboratory, twelve hours. Three credits. No prerequisites. This course may be substituted for Economic Zoölogy, upon completing enough work to meet the approval of the instructor.

This course consists largely of early forenoon field trips to the various meadows, woods, ponds, and streams in the vicinity of Manhattan. It is a combination of the study of animals in their habitats in relation to each other, to plant life, and to man, and of methods of conducting field trips with children and high-school students. Collections of live forms are made during the trips, and these are studied in more detail in the aquaria and cages in the laboratory. Special study is made of methods of keeping animals alive in aquaria and cages for further observation of habits and forms. Several children are selected from the grade schools and allowed to make a number of the trips and to participate in the studies in the field and laboratory and in the arrangement of the aquaria and cages.

Division of College Extension

EDWARD CARL JOHNSON, *Dean*

The people of Kansas believe in using their educational institutions to their full capacity, not only for the students privileged to come to them, but also for the State at large. They know that the number who complete the College course in agriculture, engineering or home economics is small in comparison to the great majority of the people who can not go to college, and it is their wish that this majority also may be served. With this desire the Agricultural College is in full sympathy, and it is its ambition not only to give its resident students the best possible training for leadership in life's work but to be of direct service to every community of the State.

To be of state-wide service has been the policy of the Agricultural College from its early history. As far back as 1864 conventions of the farmers of Manhattan and vicinity were held at the College. The first well-organized farmers' institute conducted under the auspices of the faculty was held at Manhattan, November 14, 1868, and this was followed by a similar gathering at Wabaunsee, November 21 and 22 of the same year. In 1868 the Board of Regents adopted a resolution recommending "that a system of lecturing on agricultural subjects at this College and the populous settlements of the several counties of the State should be conducted so that the benefits of farming according to correct agricultural principles may be disseminated throughout the State."

A few meetings were held each year for the next several years, increasing in number from 1879, but no definite appropriation for extension work was made until 1899, when \$2000 per year was appropriated for this purpose by the State legislature. The annual appropriation remained at this figure until 1905, when the legislature appropriated \$4000 for the work, to which the College added \$800. Up to 1905 no regular staff for extension work was employed, and all extension activities were conducted by a committee. In October of that year, however, a superintendent to organize the institute work was selected by the Board of Regents, and in July, 1906, the Department of Farmers' Institutes was formally organized.

The interest in extension work throughout the State now developed rapidly. In 1907 the legislature appropriated \$10,500 for the two years, to which the College added \$1000. In 1909 the belief in the value of agricultural extension was so great that \$52,500 was appropriated by the legislature for the biennium, and this amount has been increased by each succeeding legislature, \$35,000 being appropriated for 1912, \$40,000 for the year 1913, \$45,000 for 1914, and \$50,000 for the year ending June 30, 1915.

This rapid development of extension work was made possible not only because the people of the State wished to have such work done, but be-

cause much new light has been thrown on the essentials in agriculture by the effective experimental work done by the Experiment Stations and by the United States Department of Agriculture.

In 1914 the federal government felt that the useful and practical information on subjects connected with agriculture and home economics developed by the experiment stations, the Department of Agriculture, and by the experience of the best farmers and farm homes should be made more readily available to everyone, and in order that it might be more fully and effectively diffused among the people of the several states and its practical application encouraged, the Congress of the United States, in 1914, passed the Smith-Lever bill, which provides for "coöperative agricultural extension work between the agricultural colleges in the several states receiving the benefits of an act of Congress approved July 2, 1862, and of acts supplementary thereto, and the United States Department of Agriculture." To further this act the Congress provided for an annual appropriation of \$480,000, of which \$10,000 is paid each year to each state which assents to the provisions of the act. This initial appropriation is increased each year for seven years, such increase being allotted annually to each state in the proportion which the rural population of each state bears to the total rural population of all the states, providing an equal sum has been appropriated for that year by the legislature of such state, or has otherwise been provided from within the state, for the maintenance of the coöperative agricultural extension work.

Under this act the coöperation of the agricultural colleges and the United States Department of Agriculture has been assured, extension work has become a national as well as state project, and its effectiveness has been greatly increased.

The governor of the State and the Kansas legislature of 1914 accepted the provision of the Smith-Lever act immediately, and \$10,000, therefore, was secured from the federal government for extension work for the year ending July 30, 1915. The additional sums coming from the federal funds under this act to the State for the year ending June 30, 1916, and 1917, respectively, were \$14,555.45 and \$26,685, and for the years 1918 and 1919, \$38,816 and \$50,946, respectively. These sums were offset by an equal appropriation by the legislature of Kansas, and in addition, from the appropriation made to the Agricultural College for all its work, \$30,000 was set aside for extension work for the year ending June 30, 1918. The total sum for extension work under the Smith-Lever act and from State funds for the year ending June 30, 1918, therefore, is as follows: From the federal government through the Smith-Lever act, \$48,816; from the State through the Agricultural College, \$30,000; from the State direct appropriation to offset the Smith-Lever appropriation, \$38,816; total, \$117,632.

Another act of the legislature, of very great importance to the extension activities of the Agricultural College and to the State, went into effect July 1, 1916. This is known as the county farm bureau law, or "An act providing for State and county appropriations for the support of county farm bureaus." It provides "that whenever there shall be organized in any county in the State of Kansas a county farm bureau

having a membership of 25 per cent of the *bona fide* farmers of the county, or as many as 250 farmers, and having for its purpose the giving of instructions in agriculture and home economics to the people of said county through practical demonstrations and otherwise, and the employment of a county agricultural agent or agents to prosecute this work, the Kansas State Agricultural College shall contribute, from federal and State funds granted for demonstrations in agriculture and home economics, not less than \$800 nor more than \$1600 per annum, as far as such funds are available, towards the salary of such county agricultural agent; . . . provided, that before such appropriation is made the county farm bureau shall present to the county commissioners of its county a copy of the constitution and by-laws adopted by the farm bureau and approved by the Kansas State Agricultural College, and a certified statement of deposit in a local bank of the county of not less than \$800, which shall be used, subject to the order of the county farm bureau, for providing the necessary equipment for said bureau." It is provided further that when these conditions have been fulfilled the "board of county commissioners shall appropriate from the public funds of the county a sum of money not less than \$800 per annum and not to exceed \$1600 per annum to assist in the payment of the salary of the county agricultural agent and the expenses of the farm bureau."

The administration of this law was placed in the hands of the Kansas State Agricultural College by a general clause providing that the work of the agricultural agent shall be "under the general direction and supervision of the Kansas State Agricultural College" and "the constitution and by-laws of each bureau and all accounts and expenditures of funds provided for by this act shall be subject to the approval of the director of extension of the Kansas State Agricultural College."

Since this act became effective, July 1, 1915, seven of the original ten county farm bureaus have availed themselves of its provisions, twelve additional counties have organized farm bureaus, that are at work under the provisions of this act, and others are organizing.

The rapid growth of extension work has demanded efficient administrative machinery. In the judgment of the President of the College and the Board of Regents it became necessary to create, in December, 1912, the Division of College Extension, consisting of four distinct sections—the Department of Farmers' Institutes and Demonstrations; the Department of Highway, Drainage and Irrigation Engineering; the Department of Home Economics; and the Department of Correspondence Study—each with its own head and staff. The Board of Regents made the Director of Extension the Dean of the Division of College Extension. In May, 1914, the Board of Administration added the Department of Rural Service, with a director in charge. Through this organization it has been possible to administer the extension work effectively and economically, and the Kansas State Agricultural College, through these several lines of extension service, has been able to reach directly for several years more than 300,000 people in the State and has conducted some activity in every county.

Publications covering practical subjects in the field of agriculture, home economics and rural engineering are issued from time to time by the Division of College Extension as bulletins, circulars and leaflets. The authors of these publications are the extension specialists or the specialists of the departments in the other divisions of the College. The regular publications of the Experiment Station also are used extensively in the extension work. A series of publications in coöperation with the United States Department of Agriculture is receiving special attention. Extension publications are mailed regularly to a list, composed of members of farm and home institutes, home-makers' clubs, extension schools, and farm bureaus; *i. e.*, to members of organizations coöperating closely with the Agricultural College. Any citizen of the State, however, on request, may secure copies of individual publications.

While the extension work is directed by the Division of College Extension for administrative efficiency, its scope would be limited were it not for the close coöperation of the other divisions and departments of the College, which help not only in supplying lecturers for agricultural meetings and extension schools, material for publication, assistance in demonstration work and helpful counsel, but also are responsible for all subject matter taught by the extension specialists.

Farmers' Institutes and Demonstrations

- EDW. C. JOHNSON, Superintendent
 * H. J. UMBERGER, Demonstration Supervisor Agricultural Agent Work
 A. S. NEALE, Dairying and Assistant Superintendent Extension Schools
 * OTIS E. HALL, Boys' and Girls' Clubs
 L. C. WILLIAMS, Assistant to the Superintendent
 GEO. O. GREENE, Horticulture
 G. E. THOMPSON, Crops
 H. J. BOWER, Soils
 ROSS M. SHERWOOD, Poultry Husbandry
 CARL P. THOMPSON, Animal Husbandry
 T. H. PARKS, Entomology
 * P. E. McNALL, Farm Management
 GEO. M. POTTER, Veterinary Medicine
 † F. W. CALDWELL, Animal Husbandry
 † F. S. HAGY, Crops and Soils
 † DE H. BRANSON, Animal Husbandry
 † JOHN HARRIS, Veterinary Medicine
 * LOTTIE MILAM, Assistant State Club Leader
 * W. A. BOYS, District Agricultural Agent, Hays
 * P. E. CRABTREE, District Agricultural Agent, Scott City
 * C. G. ELLING, District Agricultural Agent, Parsons
 * LEE H. GOULD, District Agricultural Agent, Dodge City
 * I. N. CHAPMAN, County Agricultural Agent, Leavenworth County
 * A. L. CLAPP, County Agricultural Agent, Morris County
 * WM. R. CERRY, County Agricultural Agent, Doniphan County
 * V. M. EMMERT, County Agricultural Agent, McPherson County
 * A. D. FOLKER, County Agricultural Agent, Jewell County
 * O. C. HAGANS, County Agricultural Agent, Miami County
 * PRESTON O. HALE, County Agricultural Agent, Chase County
 * J. C. HOLMES,† County Agricultural Agent, Cowley County
 * KARL KNAUS, County Agricultural Agent, Cloud County
 * F. P. LANE, County Agricultural Agent, Harvey County
 * JOHN D. LEWIS, County Agricultural Agent, Nemaha County
 * E. J. MACY, County Agricultural Agent, Montgomery County
 * H. L. POPENOE, County Agricultural Agent, Lyon County

* The U. S. Department of Agriculture coöperates in furnishing directly a part of the salaries and the franking privilege. The county farm bureaus served furnish a part of the salaries and the expenses of the county agricultural agents.

† Temporary for Extension School season and hog-cholera work.

‡ Resigned January, 1917.

- * R. W. SCHAFER, County Agricultural Agent, Washington County
- * R. P. SCHNACKE, County Agricultural Agent, Pawnee County
- * R. O. SMITH, County Agricultural Agent, Wilson County
- * C. H. TAYLOR, County Agricultural Agent, Atchison County
- * W. E. WATKINS, § County Agricultural Agent, Allen County
- * F. B. WILLIAMS, County Agricultural Agent, Marshall County
- F. W. KIRK, Extension Agent for Negroes

Each farm and home institute of the State is an association or farmers' club, with regular officers, constitution and by-laws, and is required by law to meet at least annually. Many of these organizations hold six or more monthly meetings. The College plans to send two specialists to present at the annual meeting certain well-defined lessons in some branch of agriculture and home economics. The specialists and their subjects are chosen because of a known need or interest in a particular community, or with a view to starting or encouraging certain definite lines of work.

The programs for all annual meetings are based on suggestive outlines sent out by the institute department. These are completed and returned by the local committees. Programs and posters then are printed and sent out free. The department furnishes literature, on request, for members who are to take part in the program of an institute, grange, farmers' union, or other organization.

During the institution campaigns of the last two seasons an average of 390 annual institute meetings have been held with College assistance, with an attendance of approximately 100,000 people.

Special meetings are held by many of the institutes for the discussion, on certain designated days, of special subjects, such as the marketing of livestock, farm accounting, horse power on the farm, farm buildings, school consolidation, and so on.

The excellent monthly meetings which are held by many of the local organizations in this State are one of the most important features of the institute work. These meetings are held usually on the second Saturday afternoon of each month from September to May. The Department of Institutes and Demonstrations suggests the subject for discussion and the same subject is discussed in every institute in the State. In this way certain very important subjects have been discussed by thousands of farmers, at seasonable times, thus promoting a general uniformity of action. Every institute is required to hold at least three monthly meetings in addition to the annual meeting before it is entitled to county aid.

Each year some special topic, such as farm management, the management of livestock, gardening, orcharding, dairying, or the preservation of waste, is made especially prominent in institute programs, either for the whole State or for certain specified districts.

Every institute has a membership paying a definite membership fee. The membership lists constitute the mailing list for the publications issued by this department. In addition to receiving these pamphlets each member who fills out and returns a membership blank receives from the College, from the government or from some State experiment station such other obtainable literature as his interests demand.

* The U. S. Department of Agriculture coöperates in furnishing directly a part of the salaries and the franking privilege. The county farm bureaus served furnish a part of the salaries and the expenses of the county agricultural agents.

§ Resigned February, 1917.

EXTENSION SCHOOLS

The demand among men and women for instruction in the essentials of agriculture and home economics is steadily increasing. Owing to the nature of the farm and home institute it is able to meet this demand only in part, and for that reason extension schools or short courses in agriculture and home economics have been organized in communities which desire more complete courses in these subjects than can be given at the institute.

The College through its Extension Division now conducts extension schools in agriculture and home economics of five days' duration, with four instructors for each school. Here well-planned, comprehensive courses are given in the various lines of agriculture and home economics so that in a week's work some of the essentials of these subjects may be learned. The local committees are required to organize the classes and pay the local expenses for each school. The Agricultural College supplies the teachers and pays their railroad fares from funds appropriated to it for this purpose.

In addition to these general schools, special schools in breeding, dairying, poultry, orcharding, road making and cement construction are held in communities desiring them and willing to defray the local expenses. Five-day schools in home economics may be had on request. (See *Home Economics*, page 374.)

Extension schools have been popular from the first. During the season 1914-'15 there were eight general extension schools held, with an average attendance of 119. These schools proved so satisfactory that five out of the eight communities in which they were conducted immediately made arrangements to hold schools the next season. In addition to these, eleven other towns sent in petitions, making a total of sixteen five-day schools in 1915-'16.

During the season 1916-'17 twenty-four of these combined schools were held. Plans are being made to accommodate a larger number of communities with such extension schools in order to meet the rapidly increasing interest in them. Combined extension schools are held from November 1 to March 1. An average of twenty-five special poultry schools have been held each season, and eight breeding schools were conducted in the spring of 1917.

AGRICULTURAL DEMONSTRATIONS

GENERAL FIELD DEMONSTRATIONS. The specialists from the Agricultural College who work in extension schools and institutes during the winter months, devote the spring, summer and fall to demonstrations of agricultural methods and practices in those communities where schools and institutes have been held, on individual farms and in conjunction with farm bureaus and county agents. Not only are field tours and field meetings conducted to emphasize the value of certain practices already in use by the best farmers in each community, but demonstrations in silo building, in stock judging and feeding, in the results of the use of pure-bred sires, in the production of clean milk; in soil and crop management, in seed selection and testing, in orchard pruning and spraying, in

insect control, in prevention of animal diseases and in general farm management are conducted under the supervision of these specialists. Each specialist also prepares timely press articles to direct the attention of the farmers of the State to things of special interest and value.

AGRICULTURAL AGENT WORK. The activities of agricultural agents consist of conducting demonstrations, assisting farmers with suggestions and plans relative to the farm business and in organization for rural activities. The field demonstrations are conducted for the purpose of introducing new crops, and of testing relative values of varieties already grown and methods of cultivation and of harvesting. Demonstrations in proper methods of feeding, care and management of livestock are conducted. Methods of controlling insects and diseases of farm crops, orchard and garden and diseases of livestock are demonstrated. Surveys of the farm business are made in order to study the conditions prevailing in typical areas and possible improvements in farm-management methods that should be employed. Community welfare in which better social relations are fostered is also an important feature of this work. The agent interests himself in practically every farm activity, especially where there is need of improvement.

DISTRICT AGENTS. The College is employing four district agricultural agents, each one confining his activities to a few counties. One has headquarters at Hays, conducting work in counties along the Union Pacific lines in western Kansas; another at Scott City, working in counties from Rush west to the Colorado line; a third at Dodge City, conducting demonstrations in the counties in the southwestern part of the State; and a fourth at Parsons, working in several counties in southeastern Kansas. These men conduct demonstrations on from four to six or more farms in each county in the assigned territory, in the growing of crops, in the handling of stock, and in general farm management.

COUNTY AGENTS. In addition to the district agents, the College has assisted in locating county agricultural agents in the following counties: Leavenworth, Montgomery, Cowley, Allen, Harvey, Linn, Miami, Lyon, Jewell, Atchison, Cloud, Wilson, McPherson, Pawnee, Marshall, Nemaha, Chase, Washington, Doniphan, and Morris counties.

Previous to July 1, 1915, the first ten of the counties mentioned were each employing a county agricultural agent who devoted his entire time to agricultural demonstration work in the county. This work was supported partly by appropriations from the United States Department of Agriculture, partly from appropriations under the federal Smith-Lever act, and partly from farm-bureau membership fees and private subscriptions.

Following the enactment of the farm-bureau law, in 1915, the farm bureaus in Leavenworth, Montgomery, Harvey, Lyon and Jewell counties increased their membership to more than the required 250 by April 4, 1916, in order to avail themselves of county appropriations, and since that time the remaining five have raised their membership to more than the required number, and, with three exceptions, are at this time main-

tained by federal, State and county funds. In three counties—Cowley, Linn and Allen—after the bureaus had perfected their organization to meet all the requirements of the law the commissioners refused appropriations owing to lack of funds in the county treasuries, and the work has been interrupted until such appropriations are made.

During the year 1916 six additional counties—Cloud, McPherson, Pawnee, Marshall, Wilson and Nemaha—organized farm bureaus with a membership of more than 250 farmers each, and these are all maintained by federal, State and county funds. In addition to this, since January 1, 1917, the counties of Chase, Washington, Doniphan and Morris have organized similarly and have agents hired, making at the present time (April 1, 1917) seventeen counties in which farm bureaus and agricultural agents are conducting work in coöperation with the Agricultural College. Three other counties—Franklin, Anderson and Shawnee—are ready to hire agents, and organization work is being actively conducted by the farmers in several others. In every county where farm bureaus and county-agent work is now conducted funds are appropriated to it by the county, through the county commissioners, by the State through the Agricultural College, and by the federal government through the United States Department of Agriculture, and the work is on a permanent basis.

FARM MANAGEMENT DEMONSTRATIONS. Farm-management demonstrations are conducted by a farm-management specialist in coöperation with the agricultural agents. In these demonstrations such records are taken as are essential to the determination of the net profits of individual farms. These records are classified according to different types of farming, the profits from each type are determined, and individual farm records are compared with the average of all the farm records taken. The results of the study are made known to each farmer interested, in order that he may use the suggestions received in any needed reorganization of his own business. For those who desire it, farm account books are opened and instruction briefly given in keeping simple records. This work was begun in September, 1914, and by April 1, 1917, seventeen counties had made definite arrangements for farm-management work.

BOYS' AND GIRLS' CLUBS

The Department of Institutes and Demonstrations is now promoting boys' and girls' club work as a definite and practical line of extension service in agriculture and home economics. The club work is divided into club projects, and each project represents some specific farm or home activity, such as corn growing, pig feeding, gardening, canning, bread baking and sewing. Through these clubs some of the best methods and practices which the College has to recommend are being put into operation by boys and girls who may never be able to get help from the College in any other way. The work of these clubs is conducted in coöperation with farm and home institutes, county farm bureaus, county superintendents and schools. Where organized work is not already found the boys' and girls' clubs help to open the way for such organizations as the farm and home institutes, extension schools, farm bureaus, commun-

ity welfare centers, boys' and girls' Christian associations, and other organizations that serve rural and village people.

The club membership is in the main composed of those boys and girls who are in earnest about their work and who are trying to make the farm and farm life more attractive as well as more profitable. They organize into club groups, and under the direction of the county agent, institute officer, county superintendent, teacher or other local leader they carry out the instructions which are sent from the College. The leaders help the club members to keep the proper records for all work done. They also help the College to see that the boys and girls take the proper projects—those which are suited to their respective sections of the State. For example, the growing of corn as one of the club projects is discouraged in those sections where kafir or feterita have been found to be more profitable. After the club projects are decided upon the local leader helps the club members to organize by choosing from the membership a president, vice president and secretary. Regular meetings are planned where this is practicable, and in this way the social phase of the work is encouraged. In 1916 ten different club projects were promoted, and there were 288 clubs in the State with a registered membership of 4890 boys and girls.

Highway, Drainage and Irrigation Engineering

W. S. GEARHART,* State Engineer
H. B. WALKER, Drainage and Irrigation Engineer
A. R. LOSH,† Assistant Engineer
C. H. SCHOLER, Assistant Engineer
W. J. KING, Assistant Engineer

HIGHWAY ENGINEERING

Since the public highways have a vital relation to the development of the State, to the country school, the country church, and the civic conditions of rural life, it is very proper that the Agricultural College should assist as far as it may in solving such highway problems as arise. This was recognized by the Board of Regents, and on September 1, 1909, a highway engineer was employed to devote all of his time to the State highway work, and the College has maintained a Highway Department since that time. Upon request the county and township officials of the State were furnished plans, specifications and estimates for road, bridge and culvert construction, and assistance was given in advertising the letting of contracts, in supervising construction, and in inspection of the finished work before acceptance. This service was furnished free of charge to the counties and townships except for the actual traveling expenses incurred, and the taxpayers, at a very small cost, were thus assured that the work done was of the proper character and first class in every respect. Largely as a result of the successful demonstrations of well-planned, permanent bridges all over the State and stretches of demonstration roads here and there constructed through this assistance, together with the state-wide educational work in institutes, public meet-

* Resigned April 4, to become engineer in charge for the State Highway Commission.

† Resigned October, 1916.

ings and bulletins, the legislature of 1917 completely revised and codified the old, obsolete, conflicting and confusing highway laws, created a State Highway Commission, with liberal authority over the highways of the State, and definitely fixed the responsibility of all highway officials. Under the new law much of the advisory work which was formerly carried on at the College, together with the supervisory and regulatory work necessitated by federal appropriations for road building, will be handled by the State Highway Commission, located at Topeka. The law requires that all material-testing laboratory work for the commission be done by the College. The strictly highway educational work will be carried on by the College as in the past.

DRAINAGE AND IRRIGATION ENGINEERING

Reclamation of farm land by drainage and irrigation is important in the development of the agricultural resources of Kansas. The eastern portion of the State has problems of flood control and of drainage of wet lands. In the western area irrigation by pumping is an important agency in development. The Agricultural College employs and maintains a drainage and irrigation engineer and assistants for the purpose of giving scientific and practical help to persons or communities interested in field irrigation or land drainage. It is the duty of this engineer to render assistance in the organization and management of drainage districts; to give advice to farmers contemplating farm drainage projects; to advise with individuals or communities interested in irrigation development; to prepare and approve plans, estimates and specifications for drainage and irrigation projects and to carry on a general campaign of education for the best methods of land reclamation. The services of this engineer are free except for the usual charge for traveling and local expenses.

Home Economics

MISS FRANCIS L. BROWN, Director
 MISS LOUISE CALDWELL, Specialist in Home Economics
 MISS STELLA MATHER, Specialist in Home Economics
 MISS MARION P. BROUGHTON, Specialist in Domestic Science
 MISS ALICE POULTER, Specialist in Domestic Science
 MISS MARY E. WRIGHT, Specialist in Domestic Art
 MISS MINNIE SEQUIST, Specialist in Domestic Art
 MISS M. WINIFRED FORTNEY,* Specialist in Domestic Art
 MISS MATILDA J. WILSON, Secretary

Instruction in home economics is secured by about 800 women annually at the Agricultural College, and there are many thousand others throughout the State who have had the advantages of resident instruction either in this or some other institution. Large as this number may seem, it is small when compared to the great number of women and girls of the State to whom these courses are not available. To give as much assistance as possible to this vast majority of women is the aim of the Department of Home Economics in Extension, and with this in view, nine women are regularly employed and three others have been employed part time as special assistants during the year. The extension work in

* Resigned January 1, 1917.

home economics is conducted through farm and home institutes, extension schools, special women's meetings, county normal institutes, home-makers' clubs, by judging at fairs, through lectures at chautauquas, and by means of personal correspondence. During the institute season from October to March four women spend full time in giving lectures and demonstrations before farm and home institutes and home-makers' clubs conducted in connection with them. From March to September, inclusive, the same specialists assist in women's meetings, in county normal institutes, and in judging at fairs, at chautauquas, and in special extension schools. From May to September, inclusive, one woman gives her time to community assembly work. For the entire year the remaining four women spend their time in extension schools and special meetings.

EXTENSION SCHOOLS IN HOME ECONOMICS

The extension schools in home economics, covering a period of a week in a place and giving definite courses of instruction, enable the women of the State to avail themselves of the opportunities offered by the Agricultural College at their very doors. The sessions of the school are conducted both forenoons and afternoons, each half day being divided into a lecture period of one hour and a demonstration period of one and one-half hours. For any one school two courses from the following list may be selected: Food preparation, home management, home nursing, sewing, canning, dietetics, and home art. The minimum required membership for a school of this kind is fifteen, but as many more may become members as the room in which the school is to be held can accommodate. A tuition fee, usually of \$1 per member, is collected by the local committee to be used in defraying the local expenses. Schools in home economics alone are held from March until October, and in connection with extension schools in agriculture from November until March. During the year 1915-'16 thirty-eight schools were held, the attendance being 1387 individuals.

Special schools in dressmaking are held on request. These are two weeks in length, lasting from Monday afternoon until the second Friday evening. An enrollment of not less than twenty is required, the tuition fee usually being \$1.50. The dressmaking schools are designed primarily to give general instruction in sewing and special suggestion to members desiring to make their own dresses.

Rural Service

WALTER BURE, Director

Wherever rural communities show a desire to progress in any phase of organized life, the Rural Service Department is ready to render assistance. Instruction by lectures is given on new school movements, such as consolidation, rural high-school development, vocational training and social-center work. Where desired and timely, assistance is given to secure organized permanency to these movements in the local community.

Lectures and assistance dealing with educational and social phases of rural church activities are furnished by this department, and presentations of coöperative organization work also are available.

A rural-life conference, or school for rural leaders, conducted each year at the College, serves a large number of leaders interested in rural organization work.

Rural community surveys are conducted in communities in the State when requests come from an organized group with influence to inaugurate a community development program based on the results of such a survey.

During the summer months community assemblies are conducted in rural communities by this department. These assemblies are four-day sessions conducted in the community. The programs consist of popular presentations of home economics and agriculture by lectures and demonstrations, community welfare, pageantry, community music and educational moving pictures. The assemblies combine some of the features of demonstration schools and chautauquas and in addition include the play and pageant training. Six assemblies were held in 1915 and fourteen will be conducted in 1916. Lecture courses are conducted during the winter months, and a lecture service bureau is maintained throughout the year.

Home-study Service

(Correspondence Study.)

M. G. BURTON, Director
GEO. E. BRAY, Industrial Subjects
E. M. TIFFANY,* Agronomy
D. W. ZIEGLER, Animal Husbandry
M. G. KIRKPATRICK, Educational Subjects
MARY M. BAIRD, Home Economics
_____, English and History

NOTE.—The corps of instructors employed in the Department of Home-study Service devote their entire time to the work of teaching by correspondence. They closely correlate all of their work with the various divisions and departments of the institution, and keep all the credit work under the direct supervision of the regular members of the faculty.

The Kansas State Agricultural College, believing that it is as much a part of the function of the institution to offer its advantages to those who can not attend the College classes as it is to offer instruction to those who are able to undertake residence work, offers to the citizens of Kansas an opportunity to study at home the various lines of agriculture, home economics, mechanic arts, farm engineering, and many high-school subjects.

Opportunity, therefore, is offered for systematic study by correspondence in many subjects which have a direct bearing upon the various problems of the farm, home, and community. In order to meet the widely varying needs and conditions of the different classes of people, and to make it practicable for those who are not accustomed to regular habits of study as well as for those who are studiously inclined, the service of this department is rendered by three different methods:

* Resigned January, 1917.

I. *By the Reading Courses*, each of which is devoted to the discussion of a single subject or problem in a simple, brief and nontechnical way. Every word is right to the point and so clear that it can not be misunderstood. In order to make these Reading Courses a perfect boon to every home, a very comprehensive list of subjects is offered, and no fee is required for the service. Full explanation of the details, as well as the list of subjects offered under the Free Reading Courses will be found in Home-study Service Bulletin, Part I.

II. *By Extension Courses*, in which complete comprehensive courses covering a number of related subjects are presented. This line of service is adapted to the needs of those who are ambitious for scientific training, but who may not have met the requirements for college entrance. It is the nearest possible home parallel to a college education. For full explanation of the extension courses see Home-study Service Bulletin, Part II.

III. *By College Credit Courses*, where college subjects are offered by the correspondence method for regular credit. For detailed information relative to this work offered for College credit see Home-study Service Bulletin, Part III.

FOR WHOM INTENDED

The work of the Department of Home-study Service has been made sufficiently broad so that it will offer valuable assistance to all citizens who are in any way interested in the various agricultural, mechanic-art and home problems. The extension and the credit courses will be of special interest to the following classes of persons:

- (1) Boys and girls who have completed the common-school course of study, but who can not immediately attend a high school or other preparatory school;
- (2) Young men and women who feel that their school days are over, but who have aspirations, not yet satisfied, for a better education;
- (3) Men and women of middle life who wish to know more of the sciences of the farm and of the home;
- (4) Men who have been farming along general lines, but who have developed an interest in some special kind of work, such as orcharding or dairying, and who wish to direct their attention chiefly to that field;
- (5) Road supervisors who need to know more of the science of road making, the building of culverts, etc., but who can not afford to stop their work and take a special course;
- (6) Men and women who have passed middle life, who are about to retire from active farming, but who intend to keep their minds young by study, and who desire to enrich their own experience by adding what has been discovered by the scientific research of others;
- (7) Capitalists and business men who are holding investments in land, and who should know how to make those investments increase in value;
- (8) Teachers who desire to teach agriculture or home economics in special classes, or who wish to learn how to enrich their teaching in the sciences, and who wish to prepare in other subjects for examination; and

(9) Mother's clubs or other organizations, also classes of girls in village and rural schools who wish to take up some definite line of study.

Only a small percentage of the farming population of Kansas is able to attend the classes in the Agricultural College; about 100,000 people attend the farmers' institutes; several thousand attend the extension schools; about 70,000 come in more or less direct contact with agricultural agent work. There still remain nearly a million adult people living in the country, few of whom have ever read carefully a single book on farm crops, feeding, dairying, farm management, horticulture, farm drainage, or the like. These are the people for whom this work is designed.

Free Reading Courses

The following Reading Courses, based on free bulletins, have been prepared and are in use. Others will be added as need arises.

AGRICULTURE

Soils and Fertility

- RA 1. The Soil
- RA 3. Humus
- RA 4. Barnyard Manure
- RA 5. Green Manuring
- RA 6. Commercial Fertilizers
- RA 7. The Control of Blowing Soils

Farm Crops

- RA 102. Corn Culture
- RA 103. Wheat and Its Culture
- RA 104. Wheat in Western Kansas
- RA 105. Preparing the Land for Wheat
- RA 106. Oats and Their Culture
- RA 107. Barley and Its Culture
- RA 108. Grain Smuts
- RA 109. Kafir and Its Culture
- RA 110. Feterita and Its Culture
- RA 111. Milo and Its Culture
- RA 112. Sweet Sorghums and Their Culture
- RA 113. Sorghum Sirup Manufacture
- RA 114. Sudan Grass and Its Culture
- RA 115. Broom Corn and Its Culture
- RA 117. Meadow and Pasture Grasses
- RA 118. Rape and Its Culture
- RA 119. Peanuts and Their Culture
- RA 120. Cowpeas and Their Culture
- RA 121. Soy Beans and Their Culture
- RA 122. Alfalfa and Its Culture
- RA 123. Red Clover and Its Culture
- RA 124. Sweet Clover and Its Culture.

Garden Crops

- RA 201. The Home Vegetable Garden
- RA 202. The Potato and Its Culture
- RA 203. Potato Diseases
- RA 204. Sweet Potatoes and Their Culture.
- RA 205. Tomatoes and Their Culture
- RA 206. Cabbage and Its Culture

- RA 207. Diseases of Cabbage and Cauliflower
- RA 208. The Onion and Its Culture
- RA 209. Cucumbers and Their Culture
- RA 210. Asparagus and Its Culture
- RA 211. Celery and Its Culture
- RA 212. Popcorn and Its Culture

Orchard Crops

- RA 301. The Apple and Its Culture
- RA 302. Apple Orchard Management
- RA 303. Pruning
- RA 304. Insect and Fungous Enemies of the Apple
- RA 305. The Peach and Its Culture
- RA 306. Spraying Peaches
- RA 307. The Pear and Its Culture

Small Fruits

- RA 401. The Home Fruit Garden
- RA 402. Plant Propagation
- RA 403. Strawberries and Their Culture
- RA 404. Raspberries and Their Culture
- RA 405. Grapes and Their Culture
- RA 406. Grape Diseases and Pests
- RA 407. Orchard Spraying

Ornamental Plants

- RA 501. Annual Flowers
- RA 502. Lawns
- RA 503. Beautifying the Home Grounds
- RA 504. Tree Culture
- RA 505. Trees for Western Kansas
- RA 506. Black Walnuts
- RA 507. The Hardy Catalpa
- RA 508. Tree Planting in Kansas

Farm Animals

- RA 601. Breeds of Draft Horses
- RA 603. Unsoundness in Horses
- RA 604. Blind Staggers

AGRICULTURAL READING COURSE—*continued.*

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| RA 605. Navel Ill | <i>Insects</i> |
| RA 607. Breeds of Beef Cattle | RA 701. The Chinch Bug |
| RA 608. Feeding Cattle | RA 702. The Hessian Fly |
| RA 609. Making and Feeding Silage | RA 703. Insect Pests of Alfalfa |
| RA 610. Breeds of Dairy Cattle | RA 704. The Spring Cankerworm |
| RA 611. Dairy Farming | RA 705. Insects Injurious to Stored Grains |
| RA 612. How to Raise Calves on Skim Milk | RA 706. The White Grub |
| RA 613. Production of Clean Milk | RA 707. The Stable Fly |
| RA 614. Breeds of Sheep | RA 708. The Honey Bee |
| RA 615. Sheep Raising | RA 709. Comb Honey Production |
| RA 616. Foot-and-mouth Disease | RA 710. Treatment of Bee Diseases |
| RA 617. Tuberculosis | RA 711. Outdoor Wintering of Bees |
| RA 618. Lumpy Jaw | RA 712. White Ants |
| RA 619. Breeds of Hogs | <i>Agricultural Economics and Sociology</i> |
| RA 620. Hog Feeding | RA 801. How to Use Farm Credit |
| RA 621. Hog Cholera | RA 802. The Farmer's Living |
| RA 622. Breeds of Poultry | RA 803. Community Welfare |
| RA 623. Poultry Management | RA 804. Live Stock Shipping Associations |
| RA 624. Capons and Caponizing | <i>Miscellaneous Agricultural Subjects</i> |
| RA 625. Incubation of Eggs | RA 901. Bindweed |
| RA 626. Brooding of Chickens | RA 902. Canada Thistles |
| RA 627. Turkeys | RA 903. Some Useful Birds |
| RA 628. Ducks and Geese | RA 904. The Pocket Gopher |
| RA 629. Poultry Diseases | RA 905. Hogging Down Crops |
| RA 630. Squab Raising | RA 906. How to Destroy Rats |
| RA 631. Feeding Dairy Cows | RA 907. Weeds |
| RA 651. Duck Raising | |
| RA 661. Meat on the Farm | |
| RA 671. Feeding Grain Sorghums | |

MECHANIC ARTS

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| <i>Farm Machinery</i> | RI 503. Gardens |
| RI 1. Gasoline Engines | RI 504. Orchards |
| RI 2. Corn Cultivators | RI 505. Grain Fields |
| RI 3. Corn Harvesting Machinery | RI 506. Sugar Beets |
| RI 4. Care of the Farm Machinery | RI 507. Alfalfa |
| RI 5. Farm Tractors | RI 508. Drainage of Irrigated Lands |
| <i>Farm Shop</i> | RI 509. Windmills in Irrigation |
| RI 101. Repair of Farm Equipment | RI 510. Trenching Machinery |
| RI 102. The Use of Paint | <i>Farm Buildings</i> |
| RI 103. Horseshoeing | RI 603. The Farm Home |
| <i>Farm Concrete Work</i> | RI 604. Ice Houses |
| RI 301. Cement, Mortar, and Concrete | RI 605. Poultry Houses |
| RI 302. Use of Concrete on the Farm | RI 606. Hog Houses |
| RI 303. Concrete Silo Construction | RI 608. Care of Farm Buildings |
| RI 304. Concrete Fence Posts | <i>Miscellaneous Industrial Subjects</i> |
| RI 305. Underground Silos | RI 701. Farm Woodlot |
| <i>Roads in the Country</i> | RI 702. Farm Water-supply Systems |
| RI 401. Benefits of Improved Roads | RI 703. Farm Sewage Disposal |
| RI 402. Sand, Clay, and Burnt Clay Roads | RI 704. Farm Drainage |
| RI 403. The Road Drag and How to Use It | RI 705. Farm Power |
| <i>Irrigation</i> | RI 706. Farm Lighting |
| RI 501. Information for Beginners | RI 707. Preservative Treatment of Farm Timbers |
| RI 502. The Construction of Small Irrigation Ditches | RI 708. Farm Mechanics |
| | RI 709. Breaking and Training Colts |

MECHANIC ARTS READING COURSE—*continued*.

RI 710. Lightning and Lightning Conductors	RI 714. Hoppers for Poultry Feeding
RI 711. Ice-box Construction	RI 715. Bird House Construction
RI 712. Trap Nest Construction	RI 716. Rabbit Trap Construction
RI 713. Fly Trap Construction	RI 717. Supplying Water for Stock
	RI 718. Proper Handling of Gasoline

HOME ECONOMICS

<i>Foods and Nutrition</i>		RHE 402. Ways of Using Cornmeal
RHE 1. Nutrition		RHE 403. Popcorn
<i>Preparation of Foods</i>		RHE 404. Corn as Food
RHE 101. Bread		RHE 405. Breakfast Foods
RHE 102. Cheese		<i>Preservation of Foods</i>
RHE 103. Butter		RHE 501. Home Care of Foods
RHE 104. Vegetables		RHE 502. Milk
RHE 105. Food for Young Children		RHE 503. Milk and Its Bacterial Content
RHE 106. School Lunches		RHE 504. Vegetable Canning
RHE 107. Homemade Fireless Cookers and Their Uses		RHE 505. Tomato Canning
<i>Proteins</i>		RHE 506. Peach Canning
RHE 201. Milk		RHE 507. Grape Juice
RHE 202. Eggs		RHE 508. Preserving Apples by Evaporation
RHE 203. Legumes		RHE 509. Fruits and Jellies
RHE 204. Nuts		RHE 510. Muscadine Grape Syrup
RHE 205. Meats		<i>Household Pests</i>
RHE 206. Fish		RHE 601. Mosquitoes
RHE 207. Mutton		RHE 602. Fleas
RHE 208. Economy in the Use of Meat		RHE 603. Carpet Beetle
RHE 209. Poultry as Food		RHE 604. House Centipede
RHE 210. Food Value and Uses of Poultry		RHE 605. Cockroaches
RHE 211. The Guinea Fowl and Its Uses as Food		RHE 606. Moths
<i>Carbohydrates or Starches and Sugars</i>		RHE 607. Insects and Their Effect on Health
RHE 301. Sugar as Food		RHE 608. House Flies
RHE 302. Maple Sugar		RHE 609. House Ants
RHE 303. Sorghum Sirup		RHE 610. Silverfish
RHE 304. Use of Honey		RHE 611. Harvest Mites or "Chiggers"
RHE 305. Root Crops as Food		RHE 612. The Bedbug
RHE 306. The Native Persimmon		<i>Fats and Oils</i>
RHE 307. Fruit as Food		RHE 701. Economical Use of Fats in the Home
RHE 308. Okra; Its Culture and Uses		RHE 702. Peanut Oil
<i>Cereals</i>		
RHE 401. Food Value of Corn, Kafir, and Cowpeas		

For further information relating to Free Reading Courses, send for Home-study Service Bulletin, Part I.

Extension Courses

The following Extension or Noncredit Courses are based on standard textbooks. Each subject consists of from sixteen to twenty assignments.

A period of twelve months from date of enrollment is allowed in which to complete a subject. A fee of \$3 per subject is charged for residents

of Kansas; for nonresidents the fee is \$6. Full details are to be found in Home-study Service Bulletin, Part II.

AGRICULTURAL COURSES

Agronomy

Required subjects:

1. EA 1. Essentials of Agriculture
2. EA 2. Elementary Agricultural Chemistry
3. EA 3. Soils
4. EA 4. Cereal Crops
5. EA 5. Forage Crops

(Select three additional subjects from list of electives.)

Horticulture

Required subjects:

1. EA 1. Essentials of Agriculture
2. EA 2. Elementary Agricultural Chemistry
3. EA 3. Soils
4. EA 6. Gardening
5. EA 7. Orchardring

(Select three additional subjects from list of electives.)

Animal Husbandry

Required subjects:

1. EA 1. Essentials of Agriculture
2. EA 2. Elementary Agricultural Chemistry

3. EA 8. Feeds and Feeding

4. EA 9. Animal Breeding

5. EA 10. Types and Breeds

(Select three additional subjects from list of electives.)

Dairying

Required subjects:

1. EA 1. Essentials of Agriculture
2. EA 2. Elementary Agricultural Chemistry
3. EA 8. Feeds and Feeding
4. EA 11. Farm Dairying
5. EA 9. Animal Breeding

(Select three additional subjects from list of electives.)

Poultry Husbandry

Required subjects:

1. EA 1. Essentials of Agriculture
2. EA 2. Elementary Agricultural Chemistry
3. EA 8. Feeds and Feeding
4. EA 12. Poultry Production
5. EA 9. Animal Breeding

(Select three additional subjects from list of electives.)

LIST OF ELECTIVE SUBJECTS APPLYING TO THE AGRICULTURAL COURSES

EA 9. Animal Breeding

EA 26. Beef Production

EA 4. Cereal Crops

EA 21. Dairy Manufacturing

EA 22. Diseases of Animals

EA 23. Diseases of Poultry

EA 25. Dry-land Farming

EA 11. Farm Dairying

EA 19. Farm Forestry

EA 8. Feeds and Feeding

EA 17. Floriculture

EA 5. Forage Crops

EA 16. Greenhouse Management

EA 24. Horse Production

EA 27. Hog Raising

EA 13. Insects Injurious to Farm Crops

EA 15. Insects Injurious to Garden Crops

EA 14. Insects Injurious to Orchard Crops

EA 18. Landscape Gardening

EA 6. Gardening

EA 7. Orchardring

EA 12. Poultry Production

EA 28. Sheep Feeding

EA 29. Sheep Raising

EA 20. Tree Surgery

EA 3. Soils

EA 10. Types and Breeds

By special arrangement with this Department students may choose from other lists of electives described hereafter.

INDUSTRIAL COURSES

Carpentry and Building

Required subjects:

1. EI 1. Shop Mathematics
2. EI 2. Mechanical Drawing, Applied
3. EI 3. Architectural Drawing

4. EI 4. Constructive Carpentry and Inside Finishing

5. EI 5. Heating and Ventilating

(Select three additional subjects from list of electives.)

INDUSTRIAL COURSES—*continued.**Farm Engineering*

Required subjects:

1. EI 6. Farm Drainage
2. EI 7. Farm Buildings
3. EI 8. Concrete Construction
4. EI 9. Farm Blacksmithing
5. EI 10. Farm Machinery

(Select three additional subjects from list of electives.)

Stationary Engineering

Required subjects:

1. EI 1. Shop Mathematics
2. EI 2. Mechanical Drawing, Applied
3. EI 11. Steam Boilers and Engines
4. EI 12. Gasoline Engines
5. EI 13. Blacksmithing.

(Select three additional subjects from list of electives.)

Highway Improvement I

Required subjects:

1. EI 15. Highway Construction
2. EI 8. Concrete Construction
3. EI 19. Bridge and Culvert Construction

4. EI 16. Roads and Pavements

5. EI 28. Strength of Materials

(Select three additional subjects from list of electives.)

Highway Improvement II

Required subjects:

1. EI 14. Plane Surveying
2. EI 16. Roads and Pavements
3. EI 28. Strength of Materials
4. EI 2. Mechanical Drawing, Applied
5. EI 30. Structural Engineering

(Select three additional subjects from list of electives.)

Machine Shop and General Repairing

Required subjects:

1. EI 1. Shop Mathematics
2. EI 2. Mechanical Drawing, Applied
3. EI 17. Automobiles
4. EI 13. Blacksmithing
5. EI 18. Machine Shop Work

(Select three additional subjects from list of electives.)

LIST OF ELECTIVE SUBJECTS APPLYING TO THE INDUSTRIAL COURSES

- | | |
|---|-----------------------------------|
| EI 3. Architectural Drawing | EI 15. Highway Construction |
| EI 17. Automobiles | EI 5. Heating and Ventilating |
| EI 13. Blacksmithing | EI 18. Machine Shop Work |
| EI 19. Bridge and Culvert Construction | EI 2. Mechanical Drawing, Applied |
| EI 4. Constructive Carpentry and Inside Finishing | EI 24. Pattern Making |
| EI 8. Concrete Construction | EI 14. Plane Surveying |
| EI 20. Elementary Woodworking | EI 25. Plumbing |
| EI 9. Farm Blacksmithing | EI 26. Practical Electricity |
| EI 7. Farm Buildings | EI 16. Roads and Pavements |
| EI 6. Farm Drainage | EI 27. Sheet Metal Drafting |
| EI 10. Farm Machinery | EI 1. Shop Mathematics |
| EI 21. Farm Woodworking | EI 28. Strength of Materials |
| EI 22. Foundry Practice | EI 11. Steam Boilers and Engines |
| EI 12. Gasoline Engines | EI 29. Steam Traction Engines |
| EI 23. Gasoline and Oil Traction Engines | EI 30. Structural Engineering |

By special arrangement with this Department students may choose from other lists of electives set forth in this pamphlet.

COURSES IN HOME ECONOMICS

Domestic Science

Required subjects:

1. EH 1. Household Management
2. EH 2. Foods and Cookery I
3. EH 3. Foods and Cookery II
4. EH 9. Home Nursing
5. EH 10. Home Sanitation

(Select three additional subjects from list of electives.)

Domestic Art

Required subjects:

1. EH 1. Household Management
2. EH 5. Sewing I
3. EH 6. Sewing II
4. EH 11. Home Decoration
5. EH 8. Educative Millinery

(Select three additional subjects from list of electives.)

COURSES IN HOME ECONOMICS—*continued*.

- General Course in Home Economics*
- Required subjects:
- | | |
|-------------------------------|--|
| 1. EH 1. Household Management | 4. EH 5. Sewing I |
| 2. EH 2. Foods and Cookery I | 5. EH 11. Home Decoration |
| 3. EH 9. Home Nursing | (Select three additional subjects from list of electives.) |

LIST OF ELECTIVE SUBJECTS APPLYING TO THE HOME ECONOMICS COURSES

- | | |
|-----------------------------|--|
| EH 2. Foods and Cookery I | EH 10. Home Sanitation |
| EH 3. Foods and Cookery II | EH 11. Home Decoration |
| EH 4. Foods and Cookery III | EH 12. Personal Hygiene |
| EH 5. Sewing I | EH 13. Household Bacteriology |
| EH 6. Sewing II | EH 14. Child Life and Care of Children |
| EH 8. Educative Millinery | EH 15. Household Chemistry |
| EH 9. Home Nursing | |

Credit Courses

GRADES OF WORK. Two grades of correspondence work are offered, that for entrance credit, which is equivalent to the regular accredited high-school work of the State, and that for College credit, which is made as nearly as possible equivalent to work done in residence at the College.

BY WHOM PREPARED. These courses are prepared under the supervision of the Heads of Departments of the Agricultural College faculty. The subjects are taught by the correspondence-study specialists under the same regulations which govern residence work.

EXAMINATIONS Examinations may be taken at the College or under conditions approved by the College. In the latter case arrangements can often be made with the local county superintendent or superintendent of schools to conduct the examination.

REGULATIONS. 1. Enrollments for correspondence-study work will be received at any time during the year, and students may continue their work uninterrupted throughout the entire year.

2. Correspondence students will be expected to complete any course for which enrolled within twelve months from the date of enrollment.

3. Not more than two courses may be carried through correspondence at any one time. It is recommended that a student carry but one subject at a time.

4. Each subject listed under the various departments constitutes what is known as a correspondence "course."

5. Students enrolling for correspondence courses must meet the prerequisites the same as if undertaking the work in residence.

6. A student may not be enrolled for correspondence work while in attendance at any institution of learning without special permission from the Dean or proper authorities in the institution of which he is a student.

FEES. An enrollment fee of \$10 per year is charged for residents of Kansas; \$15 for nonresidents. For this amount the student is entitled to tuition for twelve months, during which period he can carry two

courses at a time. No fee is refunded because of the student's inability to enter upon the course for which once registered. Extensions of time can be granted only where the work has been delayed because of personal illness of the student. All such cases must be taken up individually with the director of this Department.

BOOKS AND STATIONERY. Students will be expected to provide all textbooks, drawing outfits, stationery and other materials required in their courses, also to pay postage on lessons one way.

COURSES OF INSTRUCTION

ENTRANCE CREDIT

(Accredited High-school Branches)

A number of courses of regular high-school rank are offered in each of the following general subjects:

English	Drawing
Mathematics	Domestic Art
History	Agriculture
Manual Training	

COLLEGE CREDIT

A number of courses from each of the following divisions of the College are offered: Division of Agriculture, Division of Home Economics, Division of Mechanic Arts, and Division of General Science.

Full details regarding each course offered for entrance or College credit may be found in Home Study Bulletin, Part III. This bulletin is sent free on application.

Student Organizations

THE STUDENT COUNCIL

The student council is a representative body which was organized by the students in 1909 and received official sanction from the Board of Regents and the faculty of the College. Its objects are: "(1) To act as a representative body before the governing officers of the College in all matters that concern the individual students, student organizations, or the student body as a whole; (2) to act as a body of mediation between different student organizations or enterprises whenever such service is sought by such organizations or enterprises; (3) to take cognizance of all matters that pertain to the good name and scholarship of the student body, to the end that high standards of honor on the campus and else where may be maintained."

This student council consists of four members elected from the senior class, three from the junior, two from the sophomore, and one from the freshman class. In addition, the School of Agriculture elects a delegate, who has the privilege of speaking on subjects pertaining to his school, but has no vote. At each meeting of the council a committee of the College faculty may also be present to participate in the discussions. The members of the council are elected each term, but at each election at least two of the representatives of the senior class and one of those of the junior class must be reelected.

The student council occupies an interesting and valuable place in the College life, and as a whole may be said to be an unqualified success in establishing a system of representative government among the students touching affairs peculiarly their own, and also in matters involving the faculty. All acts of the council are submitted to the President of the College, and if they concern the rules, regulations or ordinances of the College, are subject to approval by the proper governing body. The council is especially helpful in maintaining a high standard of honor among the students in both individual and organized relations. As a means of securing a better understanding in matters likely to cause friction between the student body and the faculty, the council performs a most important function.

THE CHRISTIAN ASSOCIATIONS

The Young Men's Christian Association and the Young Women's Christian Association are organizations of the greatest worth and value in the College community, forming centers of moral culture and religious stimulus among the young men and women during their developmental period. As is well known, the Christian Association in colleges stands for the best ideals among the students, and are always accorded the cordial support of the authorities. In addition to general moral and spiritual development, the College Christian associations are of practical and

efficient influence among the students in many directions. Active membership in these associations is limited to persons connected with Protestant evangelical churches, but others are admitted as associate members.

THE YOUNG MEN'S CHRISTIAN ASSOCIATION

The College Y. M. C. A. has always been a strong and influential body among the students. Its growth may be indicated by the fact that the organization was able in 1908 to erect a handsome building for its purposes at a cost of \$35,000, on the corner of Eleventh and Fremont streets, near the College grounds.

This building contains reading rooms, committee rooms, students' living rooms, gymnasium, etc. All young men are welcome to make use of the privileges of the building, whether members or not. No fixed fees for membership are charged, each member giving whatever he feels able to afford. One of the useful and practical features of the Y. M. C. A. is a students' employment bureau, which is maintained for the benefit of all students seeking employment. The religious work of the organization includes various courses for the study of the Bible and the work of Christian missions, which are maintained through the winter. The regular religious meetings of the association occur on Thursday evenings from 6:45 to 7:30, while occasional Sunday afternoon meetings are also held. Special meetings and receptions, which serve to broaden the acquaintanceship of the students and promote good-fellowship, are arranged from time to time. Especial attention is given the new students on and after their arrival, and assistance is rendered in securing rooms and boarding places for them. The association maintains a regular secretary, with whom prospective students are cordially encouraged to correspond. Address General Secretary, Y. M. C. A., Kansas State Agricultural College, Manhattan, Kan.

THE YOUNG WOMEN'S CHRISTIAN ASSOCIATION

Similar in aim and purpose to the organization of the young men is the Young Women's Christian Association. The Y. W. C. A. home, at 905 Fremont street, is the permanent headquarters of the association, to which all young women of the College are at all times heartily welcome. An office for the secretary and a girls' rest room are also maintained during the College year on the first floor, southwest corner, of the Domestic Science and Art Building. The rooms at the College are open to visitors at any hour of the day and are attractively furnished with conveniences for rest and study.

At the association home informal gatherings and entertainments lend variety and cheer to the life of the young women members and their friends.

An employment bureau for women students is maintained by the general secretary, without charge to its beneficiaries. Various committees are responsible for the lines of work of the association. One of the most practical of these is the investigation of cases of illness among the College girls, and the rendering of assistance when necessary. At the beginning of the College terms the incoming trains are met by a committee of girls, wearing purple bows, by means of which they may easily

be recognized. This committee engages in assisting new women students in securing suitable lodging and boarding places.

During the College year various social functions are held for the benefit of the College women. The first of these is an informal reception, held on the first Friday following the opening of College, in order to enable the College girls to become better acquainted with one another. Once each year, in the winter term, the two associations entertain jointly.

The religious life of the Young Women's Association is fostered by weekly religious meetings, by courses in the study of the Bible, and in special Sunday services, for which outside speakers are often obtained. Courses for the study of mission work are also conducted.

THE NEWMAN CLUB

The Newman Club, an organization of Catholic students, holds a social meeting every other Friday evening, and on the alternate Friday evenings the time is devoted to some line of religious study under the direction of the local pastor. The College authorities recognize this Bible study by allowing a two-hour credit for it when properly certified. In further recognition of the club's efforts the College has placed a set of the new Catholic Encyclopedia on its library shelves. Furthermore, the club has purchased and placed in the College library nearly one hundred dollars' worth of Catholic books and pamphlets.

The club is now on a sound basis and is qualifying for affiliation with a national organization of Newman clubs of the various state universities and colleges. Its aim is to favorably influence new Catholic students in the knowledge and practice of their faith, to foster sound morality and good character.

LITERARY AND SCIENTIFIC SOCIETIES

The literary societies of the College, eight in number, are wholly student organizations, holding weekly meetings in the College buildings. The Alpha Beta and Franklin literary societies are open to both sexes; the Ionian, Eurodelphian and Browning societies admit only young women to membership; the Webster, Hamilton and Athenian societies admit young men only. Students are encouraged to join one of these organizations for the sake of practice in the use of language, training in debate, and general experience in conducting meetings and in dealing with their fellows. These societies jointly maintain a debating council which coöperates with a faculty committee in arranging for all intercollegiate and interstate debates participated in by representatives of the College. The oratorical board, similarly maintained by these societies, arranges for the intersociety oratorical contest.

In the School of Agriculture there are three literary societies: one for young men, the Lincoln; one for young women, the Philomathian; and one for both young men and young women, the Hesperian. These societies have the same general aims and purposes as those in the College.

AGRICULTURAL SOCIETIES.

The Saddle and Sirloin Club meets on the first and third Mondays of each month. Membership is open to all animal husbandry students above the freshman year. The object of the club is to promote the interests of animal husbandry in the College and in the State. Live-stock problems of all kinds are taken up, and members of the faculty and outside speakers are secured for addresses on special topics. The College section of the American Society of Agronomy meets on call of the president of the society. The membership includes students and instructors interested in agronomy and in allied subjects. The purpose of the society is to promote the development of agronomic work and methods, in harmony with the purpose of the organization of this name. The Agricultural Association meets Monday evenings. All students interested in agriculture are eligible to membership. The object of the association is to promote the general interests of agriculture in the College and State.

ENGINEERING SOCIETIES.

The various technical societies of the Engineering Division meet individually biweekly in departmental seminars for lectures, presentation of papers and discussion of notable articles appearing in the technical press or in the journals of the national societies. On alternate weeks all of the societies meet together as the Engineers' Association in a general seminar for lectures by eminent practicing engineers and members of the engineering faculty of this and other schools.

The students in mechanical and electrical engineering are organized as student branches of the American Society of Mechanical Engineers and the American Institute of Electrical Engineers, respectively.

The purpose of these various societies is to acquaint the students with the latest development in the fields of engineering and architecture, to give them more definite ideas as to the opportunities in their professions and the requirements for success in their profession, to promote acquaintance and fellowship among the students, and to further the interest of the engineering division in the College and the State.

THE COLLEGE BAND.

The College Band is a military organization, composed of cadets assigned to this duty for the College year in lieu of drill and technical military instruction. The Band is limited in its membership, and attendance of the members upon its exercises is obligatory. It has proved an effective aid to the cadet corps, stimulating a love for martial music, and affording an attractive feature of the various public ceremonial occasions at the College.

THE COLLEGE ORCHESTRA

The Orchestra is a student organization connected with the Department of Music, membership in which is voluntary. Its daily training under competent leadership results in the acquisition of a considerable repertoire of musical compositions of the best quality. Those connected with the Orchestra obtain in this way familiarity with the works of

many of the great composers, and among the students at large the Orchestra is an efficient aid in cultivating a taste for and an appreciation of good music.

ATHLETIC ORGANIZATIONS

By means of the gymnasium the College is prepared to give complete physical as well as mental training. This building, which is equipped with all the usual accessories, assists in developing and maintaining physical tone and health in the student body. In addition to the gymnasium classes, and physical training in the military corps of cadets, all young men are encouraged to develop their physical skill by playing on practice teams in various athletic lines. In the fall football teams are organized; in the fall and winter basketball; while in the spring baseball, tennis, and track athletics prevail. Every possible encouragement is given all students desirous of participating in these games to enter the practice teams and receive the necessary instruction. The most proficient of these have opportunity to enter the first teams and participate in intercollegiate contests. The College authorities encourage all reasonable and sane athletic development, as a means for the training of physical qualities desirable in men everywhere. Professionalizing tendencies are strictly repressed, and the athletic rules adopted by the faculty prevent, by proper regulation, all participation in intercollegiate games on the part of students deficient in their studies.

The women students have equal opportunity for general physical training with the young men. In the gymnasium, under a physical director, they receive training suitable to their needs. Basketball and tennis teams are organized among the young women.

HONORARY ORGANIZATIONS

The honorary organizations consist of fraternities, sororities, and societies. Of these, Alpha Zeta and Gamma Sigma Delta draw their members from students in the Division of Agriculture; Alpha Psi draws its members from the Veterinary Department; Sigma Tau from the Division of Engineering; Omicron Nu from the Division of Home Economics. There are chapters of Sigma Delta Chi, the journalistic fraternity; of Pi Kappa Delta, the debating fraternity; of Zeta Kappa Psi, the debating sorority. The military students have a chapter of "Scabbard and Blade," the national fraternity; and the athletic men have the "K" fraternity. Of honorary societies there are the Quill Club, composed of those who have gained distinction in writing, and the "Forum," for those who have secured forensic honors.

In addition to these student organizations there is a chapter of Phi Kappa Phi, to which students of the highest scholarship are elected. (See "Honor Societies.")

Degrees and Certificates Conferred

In the Year 1916

First Division, June 15, 1916

DEGREES CONFERRED

Graduate Courses

MASTER OF SCIENCE

Walter Albert Buck, B. S., Kansas State Agricultural College, 1913.
 Harry Winfield Cave, B. S. A., Iowa State College, 1914.
 Jesse Jonathan Frey, D. V. M., Kansas State Agricultural College, 1914.
 Lee Roy Light, B. S., Kansas State Agricultural College, 1915.
 Lloyd Franklin Metzler, A. B., Kansas State Normal, 1911.
 John Carson Ripperton, A. B., Fairmount College, 1913.
 Lawrence Paul Wehrle, B. S., Kansas State Agricultural College, 1914.

CIVIL ENGINEER

Con Morrison Buck, B. S., Kansas State Agricultural College, 1896.
 Walter Van Buck, B. S., Kansas State Agricultural College, 1911.
 *Glen Edgar Edgerton, B. S., Kansas State Agricultural College, 1904.
 Elmer George Gibson, B. S., Kansas State Agricultural College, 1896.
 Albert Richard Losh, B. S., Kansas State Agricultural College, 1910.
 Arthur Rhodes, B. S., Kansas State Agricultural College, 1905.
 Ray Thurman Wells, B. S., Kansas State Agricultural College, 1910.

MECHANICAL ENGINEER

Walter William Carlson, B. S., Kansas State Agricultural College, 1908.
 William Henry Sanders, B. S., Kansas State Agricultural College, 1890.
 Earle Locke Shattuck, B. S., Kansas State Agricultural College, 1907.

ELECTRICAL ENGINEER

Albert Stoddard, B. S., Kansas State Agricultural College, 1906.

Undergraduate Courses

DIVISION OF AGRICULTURE

BACHELOR OF SCIENCE IN AGRICULTURE

Course in Agronomy

Le Roy Alt	Robert John Hanna
William Ray Bolen	Nicholas Tichon Jerébzoff
Ira Nichols Chapman	Reuben Edward Lofinck
Kim Ak Ching	Claude Ewing Lovett
*William Bayles Coffman	Charles Gottlieb Lueker
Ralph Cleland Erskine	Willard Earl Lyness
John Laurence Garlough	James Hendrix McAdams
Nathan Arthur Gish	Albert John Mangelsdorf
Frank Simon Hagy	Edwin Isaac Maris

* In absentia.

BACHELOR OF SCIENCE IN AGRICULTURE—*continued**Course in Agronomy—continued*

*James Robert Mason	*Edward Russell
Albert Rufus Miller	George McClellan Schick
Percival Button Potter	Ralph Powell Schnacke
Joseph Vincent Quigley	Edward Loy You Shim
Roy Ralph Reppert	Guy Cephus Smith
Archie Monroe Richards	Harlan Randolph Sumner
Daniel Andrew Robbins	Francis Marion Wadley
*Rudolph George Rodewald	Luther Earle Willoughby

Course in Animal Husbandry

Walter Brown Adair	Jason Paul Loomis
Raymond Voiles Adams	Jay Laurence Lush
Alfred Carroll Apitz	*Lewis Evermont McGinnis
Hugh Edwin Baird	*Clinton Fisk McIlrath
Keatley Graham Baker	Ralph Vernon O'Neil
Orie Walter Beeler	Walter John Ott
Omar Olin Browning	Earl Ramsey
McArthur Baptiste Brush	Ralph Paul Ramsey
Orville Brown Burtis	James Edward Rouse
Fred Cromer	Richard Jerome Sedivy
James William Crumbaker	Sik Hung Taam
Herbert Horace Frizzell	Frank Andrew Unruh
Paul Bernard Gwin	Wayne Lycurgus Willhoite
Preston Orin Hale	Lewis Arthur Williams
Louis Samuel Hodgson	Clarence Burton Williams
Alfred Ernest Lawson	John Southwell Wood

Course in Dairy Husbandry

George Rigg Campbell	Chintaman Vishnu Sane
Luzerne Hallock Fairchild	Rudolph Emil Stuewe
Paul Campbell McGilliard	Archibald Glenn Van Horn
Thomas Edwin Moore	

Course in Horticulture

Morgan Thompson Binney	James Curtis Riney
William Cecil Calvert	James Homer Sharpe
Joseph Lyndon Davis	David Riley Shull
Archibald Alexander Glenn	Jay Webster Stratton
Harry Alexander Gunning	*Edmund Francis Wilson
Everett Raymond McGilliard	

DOCTOR OF VETERINARY MEDICINE

George Holland Dean	Frederick Hartwig
Earl Morris Dobbs	Eddell Charles Jones
Cecil Elder	Samuel Robert McArthur
*Gerald Woodward FitzGerald	Eugene Franklin Pile
Asa Forrest Flanagan	George Thomas Reaugh

DIVISION OF MECHANIC ARTS

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

George Shearer Douglass	Joseph Irwin Jacques
Forrest Everette Gilmore	Lawrence Leonard
George Noel Herron	Wayne Ramage

* In absentia.

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

Benjamin McKinley Andrews	Arlie Noel Johnson
Ralph Gahan Baker	Talbot Roy Knowles
Antis Monteville Butcher	Henry Dall Linscott
Nelson Harry Davis	Otto Irl Markham
Walter Emil Deal	Louis Reynolds Parkerson
George Louis Farmer	Joseph Glen Phinney
James Sidney Hagan	Gilbert Haven Sechrist
Charles Thomas Halbert	Doddridge Calvin Tate
William Wallace Kennedy Hervey	George Lin Usselman
Arthur Edward Hopkins	

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

Joseph Jesse Abernethy	Charles David Sappin
John Irl Michaels	Thomas Kenneth Vincent
John Prosser Rathbun	Leslie Adam Wilsey
Frank Richard Rawson	Charles Herman Zimmerman

BACHELOR OF SCIENCE IN ARCHITECTURE

George Wilson Christie	Elmer Warren Wilson
Lloyd Martin Ruddy	

BACHELOR OF SCIENCE IN AGRICULTURAL ENGINEERING

John Hanna Welsh

DIVISION OF HOME ECONOMICS

BACHELOR OF SCIENCE IN HOME ECONOMICS

Agnes Redmond Abbott	Hildegard Harlan
Ruth Ione Adams	Verda Harris
Mary Edith Arnold	Elsie Elnora Hart
Florence Annie Baker	Edna Avis Hawkins
Edith Nell Beaubien	Helene Held
Ada Grace Billings	Marie Margaret Hellwig
Edith Alice Boyle	Nettie Hendrickson
Mildred Branson	Vivian Herron
Amy May Briggs	Bessie May Hildreth
Mary Weir Bright	Clara Frances Hodges
Fannie Ernestine Brooks	Ruth Brandt Hoffman
Wilma Burtis	Lydia Helena Hokanson
Martha Christabel Conrad	Esther Grace Hole
Hannah Campbell	Lillian Clair Jeter
Kathleen Lenore Conroy	Mary Florence Jones
Grace Nancy Cool	Florence Justin
Cora Ellen DeVault	Vera Elma King
Florence Edith Dodd	Vera Belle Kizer
*Ethel Brown Duvall	Mary Steven Lane
Faith Elizabeth Earnest	Lillian Antoinette Lathrop
Frances Floretta Ewalt	Bertha Blanche Lauger
Martha Fern Faubion	Eva Myrtle Lawson
Elizabeth FitzGerald	Virginia Ann Layton
Anna Grace Fox	Mary Elizabeth Linton
Helen Moore Gardner	Grace Margaret Lyons
Mary Alice Gish	Mary Elizabeth McKinlay
Josie Margaret Griffith	Ora Mae McMillen
Louise Greenman	Elizabeth Abbie March
Hazel Kathryn Groff	Sara Janet Marty
Leota Lee Gromer	Lucile Maughlin
Esther Gyax	Bodil Eleanor Mickelson

* In absentia.

BACHELOR OF SCIENCE IN HOME ECONOMICS—*continued*

Anna-Lora Miller	Mary Logan Scott
Cecil Elizabeth Miller	Meta Viola Sheaff
Ella Ruth Milton	Esther Emily St. John
Alice Montgomery	Hazel Belle St. John
Vera Idol Moore	Marie Story
Mary Rose Moss	Julia Rena Strand
Corrine Myers	Kate Elizabeth Sumners
Vivian Neiswender	Mary Franc Sweet
Alma Dale Newell	Blanche Lovina Tanner
Cloda Mae Pace	Emma Elizabeth Taylor
Susan Rufina Paddock	Rhoda Ethel Tharp
Florence Nell Peppiatt	Rose Viola Tipton
Ella Dunlap Phenicie	Eva Esther Townsend
Edna Pickrell	Alberlina Tulloss
Marie Pickrell	Mary Adaline Tunstall
Helen Mitchell Pitcairn	Mary Edith Updegraff
Cora Alberta Pitman	Wilma Irene Van Horn
Thurza Elizabeth Pitman	Nellie Maude Vedder
Mary Elizabeth Polson	Avis Louise Voak
Iva Porter	Irene Ellen Walker
Mary Louise Price	Edith Mary Walsh
Eula Bess Pyle	Mamie Belle Wartenbee
Nannie Clytice Ross	Florence Elouise Waynick
Grace Ethelyn Rudy	Lois Kathryn Wemmer
Mabel Gertrude Ruggels	Ida May Wilson
Pearl Eunice Schowalter	Lois Emily Witham
Evelyn Schriver	

DIVISION OF GENERAL SCIENCE

BACHELOR OF SCIENCE

Francis Waite Albro	Leon Newton Moody
Edith Louise Alsop	Raymond Reed Neiswender
Edith Emma Arnold	Edgar Leon Noel
Wellington Tufts Brink	Edward John Otto
Katharyn Woodrow Curless	Elliott Ranney
Lola Davies	Laura Rachel Rea
Jessie Jane DeVault	Mary Louetta Taylor
Earl Raymond Harrouff	Marcia Edythe Tillman
Phoebe Jane Lund	Zorada Zerna Titus
Harold Mark McClelland	Ralph Pierce Van Zile
Robert Urie McClenahan	Charles Armand Willis
William Gladstone McRuer	Emily Thomas Wilson

BACHELOR OF SCIENCE IN INDUSTRIAL JOURNALISM

Eva Hostetler	Ethel Dresia Strother
Dorian Paul Ricord	

CERTIFICATES CONFERRED

THE CERTIFICATE IN HOME ECONOMICS

Christine Ash	Winifred Wanda Cornic
Nellie Bearman	Emma Martha Delfs
Vivian Cleo Blosser	Clara Mary Eickman
Eva May Black	Hazel Marguerite Garst
Sara Brown	Edith Hedberg
Eloise Catlin	Emma Christina Hubenett
Pearl Conaway	Hulda Margaret Hubenett

* In absentia.

THE CERTIFICATE IN HOME ECONOMICS—*continued*

Leila May James	Frances Philomena Pinney
Winifred Inez Jenkins	Hazel Rudy
Inez Dorothea Johnson	Ella Concordia Rundquist
Anna Ida Kunze	Margaret Beatrice Shakeshaft
Emma Charlotte Kunze	Dorothy Knostman Smith
Ethel Madge Latter	Elsie Avis Smith
Florence Laude	Leota Belle Snodgrass
Helene Julie Lewis	Geneva Dorothea Tangeman
Pearl May McCosh	Gertrude Wiebe
Lucile McKay	Lillian Henrietta Wiegand
Jean Garrard Nixon	Anita Wientge
Flora Hazel Parli	Dorothy Wiseley Wolff
Esther Irene Peterson	Edith May Yoho

THE CERTIFICATE IN AGRICULTURE

Percy Lindsay Arnold	Ralph Miller
Paul Adamson	Ollie Gerald Noll
Walter George Anderson	David Linneaus Ostlund
William Cook	George Herbert Phinney
Ira Dick	Raymond Curtis Redmond
Joseph Carl Eble	James Walter Rolf
Alan Edwin FitzSimmons	Thomas Shaughnessy
William Hans Freienmuth	Floyd Edward Spencer
Albert William Gehrke	Henry Martin Strube
Bert Harding	Cloice Benjamin Tarn
Harry Hill	Ralph Francis Thompson
Joseph Hunt	Charles Marion Tillotson
Wilfrid Melanchton Johnson	John Edward Tolson
Michael William Knapp	Theodore Frances Walter
Albert Charles Krehbiel	David Wiebe
Roy Lee	George Laurence Yarrow
Lee Fleming Lawson	Floyd Denzel Young
George Gilbert Leonard	Miller Robert Young

THE CERTIFICATE IN CREAMERY SHORT COURSE

John Charles Mannen	Cyrus James Wetmiller
---------------------	-----------------------

THE CERTIFICATE IN STEAM AND GAS TRACTION ENGINES

Lidolph Anderson	Charles Arthur Ewing
Warren Avery	Floyd Fike
Otto Curt Balzer	Reid Harry Freese
Andrew Duchsel Beeler	Clarence Gary
George Beeler	Fred Rudolf Geib
George Whitney Bell	Ralph William Glockle
John Carl Boehner	John Rasmus Godfreson
Raymond Houston Branson	Lester Hanawalt
Joseph Arthur Breneman	Carl Lind Harrington
Richard Brown	Arthur Hawkins
Ernest Edward Bryan	Robert John Helberg
Teddie Cade	Ludwig William Hink
James Carmody	John Horrigan
Kent Loyal Chesney	Raeburn Howard
Archie Dean	Loyal Dwight Hoyt
William Dixon	Thomas Cardiff Kearley
Clarence Carlyle Drown	Victor Kimmell
Elmer Drown	David Krehbiel
Clyde Cover Easter	George Albert Lovendahl
Robert Lee Eddingfield	Frank Doneld Lynch
David Wayne Entrikin	Daniel Joseph McGinty

THE CERTIFICATE IN STEAM AND GAS TRACTION ENGINES—*continued*

Hubert Aloysius McNamee	Lee Roy Stolfus
Oscar Neal Martin	Clarence Benjamin Stensaas
John Henry Meyer	Samuel Romaine Stewart
Earl Edward Mackender	Jay Rudesill Sutton
Martin Minge	James Harold Taylor
Joe Edward Nichols	William Harry Taylor
John Nitcher	Merle Barton Thomson
Leonard Russell Oakley	Fred Timmerman
Gust Cerenius Olson	James Tole
Guy Everett Packard	Otto Uppendahl
Clarence Jay Parry	Fred Van Nice
Raymond Perkins	Ernest Walker
Chester Peterson	Charley James Wallace
Elmer Emil Peterson	Jesse Emmett Weckel
John Frank Pishny	Charlie Owen Williamson
John Ellis Porter	Albert Lemont Wiltse
Clarence Reed Rice	John Clay Wise
Rudolph Rickenberg	James Orville Yarrow
Richard Martin Rogers	Emil Zahradnik
Nicholas Albert Schartz	Ernest Louis Zimmerman
Rudolf Phillip Schuppert	Milton Worrell
Charles Franklin Shoemaker	Worn Worrell
Sherman Stauffer	

THE CERTIFICATE IN SHOP WORK

Fred Lincoln Huff	Lewis Lloyd Thompson
Walter Henry Stoneman	Charles Manley Tinkler
Harold Ray Sutton	Frederick Lorence Wiegand
Otis Thompson	

Second Division, December 20, 1916

DEGREES CONFERRED

DIVISION OF AGRICULTURE

BACHELOR OF SCIENCE IN AGRICULTURE

Course in Agronomy

*William Deitz	John Kiene
*George Ernest Denman	Marc Atchison Lindsay
Irl Ferris Fleming	*Grosvenor Ward Putnam
Claude Fletcher	Paul Robinson
Elmer Herman Jantz	Charles George Stiensmeyer
Amwel Edwin Jones	Price Harlan Wheeler

Course in Animal Husbandry

Harold Hardesty Amos	*Lewis Augustine Maury
Bernard Martin Anderson	William O'Connell
Henry Benjamin Bayer	Raymond Smith Orr
*Ary Clay Berry	William Herbert Robinson
*Robert Elliott Curtis	Everett Warren Skinner
*Frank Harold Dillenback	Byron John Taylor
Robert Roy Lancaster	Glenn Frederick Wallace

* In absentia.

Course in Dairy Husbandry

George Murray Arnold	Robert Emmett Terrill
Donald Smith Jordan	Raymond Hazzleton Whitenack

Course in Horticulture

Sidney Rendall Vandenberg	*Walter Harris Washington
---------------------------	---------------------------

DOCTOR OF VETERINARY MEDICINE

Richard Clay Chatman	Glenn Amiel Riley
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DIVISION OF MECHANIC ARTS

BACHELOR OF SCIENCE IN ARCHITECTURE

Stanley Bushnell Baker	Frederick Albert Korsmeier
Henry Robert Horak	*Robert Edwin Sellers

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

*Charles William Hickok

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

*Andrew Jack Herold

DIVISION OF HOME ECONOMICS

BACHELOR OF SCIENCE IN HOME ECONOMICS

*Margaret Isla Bruce	*Nelle Florence Longenecker
Grace Lydia Currie	*Reah Jeanette Lynch
*Mary Rebecca Dunlap	Marie Moses
Nellie Flinn	Hazel Berdella Peck
*Ruth Esther Frush	*Olivia Esther Peugh
Elizabeth Emma Gish	Juanita Reynolds
Gladys Gist	Margaret Ursula Schneider
Bertha Belle Hole	*Florence Hazel Smith
Ruth Amelia Hutchings	*Mildred Tolles
Agnes McCord Irwin	*Elizabeth Blanche Walsh
Pearl LaClaire Jacques	

DIVISION OF GENERAL SCIENCE

BACHELOR OF SCIENCE

*Charlotte Morton	Lyndell Porter Whitehead
Harry Fred Vaupel	

BACHELOR OF SCIENCE IN INDUSTRIAL JOURNALISM

Bagdasar Krekor Baghdigian	Annette Woodward Perry
Albert Ellis Hylton	

* In absentia.

Honors

SENIOR HONORS

JUNE, 1916

Division of Agriculture:
Ira Nichols Chapman
James Robert Mason
Ray Ralph Reppert
Ralph Powell Schnacke
John Southwell Wood

Division of Home Economics:
Amy May Briggs
Martha Christabel Conrad
Cora Ellen DeVault
Mary Louise Price
Mary Franc Sweet
Lois Emily Witham

Division of Mechanic Arts:
James Sidney Hagan
Roy Talbot Knowles

Division of General Science:
Elliott Ranney
(Mrs.) Ethel Dresia Strother

DECEMBER, 1916

Division of Agriculture:
Glenn Frederick Wallace

Division of Home Economics:
Juanita Reynolds

JUNIOR HONORS

JUNE, 1916

Division of Agriculture:
Jay Howenstine Cushman
Waldo Frederick Heppe
Harold William Luhnnow
William R. Martin
Josiah Wistar Worthington
Louis Albert Zimmerman

Division of Home Economics:
Edith Irene Andrew
Myrtle Ethel Bauerfind
Martha Estella Blain
Vera Ann McCoy
Jessie Fern Preston
Alice Mae Sweet

Division of Mechanic Arts:
Jefferson Harold Flora
Oliver Keith Rumbel
Gabe Alfred Sellers

Division of General Science:
Lewis Albert Dubbs
Ralph Harold Heppe

PHI KAPPA PHI

SPRING, 1916

Raymond Voiles Adams
Martha Christabel Conrad
George Holland Dean
Cora Ellen DeVault
J. Lawrence Garlough
James Sidney Hagan
Lee Roy Light
James Robert Mason
Sara Jane Patton
Mary Elizabeth Polson

Mary Louise Price
Elliott Ranney
John Prossor Rathbun
Ralph Powell Schnacke
(Mrs.) Ethel Dresia Strother
Mary Franc Sweet
Mary Tunstall
Lois Emily Witham
John Southwell Wood

DECEMBER, 1916

Juanita Reynolds
Florence Smith

Glenn Frederick Wallace

LIST OF STUDENTS

Graduate Students

CANDIDATES FOR MASTER'S DEGREE, 1917

Cliff Errett Aubel, B. S. 1915 (Pennsylvania State College), *Agriculture*
New Castle, Pa.
Anson Lane Ford, B. S. 1915 (Kansas State Agricultural College), *Biology*
Manhattan
Frank Clyde Harris, B. S. 1908 (Kansas State Agricultural College), *Architecture*
Manhattan
Miner Monroe Justin, B. S. 1907 (Kansas State Agricultural College), *Agriculture*
Manhattan
Lorenzo Beckley Mann, B. S. 1915 (Kansas State Agricultural College), *Agriculture*
Manhattan
Clyde William Mullen, B. S. 1915 (Oklahoma Agricultural and Mechanical College),
Agriculture
Lawton, Okla.
Herschel Scott, B. S. 1915 (University of Kentucky), *Agriculture*
Manhattan

GRADUATE STUDENTS WORKING TOWARD MASTER'S DEGREE

Walter Goldsberry Allee, B. S. 1903 (Earlham College), *Chemistry*
Manhattan
Charles August Bjorkman, B. S. 1916 (Worcester Polytechnic), *Physics*
Worcester, Mass.
Kim Ak Ching, B. S. 1916 (Kansas State Agricultural College), *Chemistry, Soils*
Howard
Franklin Arthur Coffman, B. S. 1914 (Kansas State Agricultural College), *Agriculture*
Manhattan
William Bayles Coffman, B. S. 1916 (Kansas State Agricultural College), *Agriculture*
Manhattan
Ernest Edward Dale, A. B. 1913 (University of Nebraska), *Botany*
Greenwood, Neb.
Luzerne Fairchild, B. S. 1916 (Kansas State Agricultural College), *Agriculture*
Manhattan
Frank Leroy Fleming, B. S. 1914 (Kansas State Agricultural College), *Agriculture*
Reading
Percy Leigh Gainey, B. Agr. 1908 (North Carolina Agricultural and Mechanical College),
Chemistry
Manhattan
Frank Simon Hagy, B. S. 1916 (Kansas State Agricultural College), *Animal Husbandry*
Wichita
William Patrick Hays, B. S. 1913 (Kansas State Agricultural College), *Entomology*
Manhattan
Leonard Sinclair Hobbs, B. S. 1916 (Texas Agricultural and Mechanical College),
Engineering
Manhattan
John Hungerford, B. S. 1915 (Kansas State Agricultural College), *Chemistry*
Manhattan
Harry Llewellyn Kent, A. B. 1912 (Kansas State Normal School), B. S. 1913 (Kansas
State Agricultural College), *Agriculture, Education*
Manhattan
John Robinson McClung, B. S. 1910 (Kansas State Agricultural College), M. A. 1913
(University of the South), *Chemistry*
Manhattan
James Walker McColloch, B. S. 1912 (Kansas State Agricultural College), *Entomology*
Manhattan
Porter Joseph Newman, B. S. 1908, M. S. 1910 (Franklin College), *Chemistry*
Manhattan
Ray Ralph Reppert, A. B. 1907 (Baker University), B. S. 1916 (Kansas State Agricul-
tural College), *Entomology*
Valley Falls
Archie Monroe Richards, B. S. 1916 (Kansas State Agricultural College), *Agriculture*
Manhattan

- Alma Margaret Richhart, A. B. 1915 (Southwestern College), *Education, Home Economics*
 Nickerson
 Stanley Albert Smith, B. S. 1913 (Kansas State Agricultural College), *Architecture*
 Manhattan
 Ethel Vanderwilt, B. S. 1913 (Kansas State Agricultural College), *Agriculture*
 Solomon
 Ralph Pierce Van Zile, B. S. 1916 (Kansas State Agricultural College), *Economics, Public*
Speaking
 Manhattan
 Francis Marion Wadley, B. S. 1916 (Kansas State Agricultural College), *Entomology*
 Newton
 Lois Emily Witham, B. S. 1916 (Kansas State Agricultural College), *Chemistry, Bac-*
teriology
 Manhattan
 Daniel Walter Ziegler, B. S. 1913 (Kansas State Agricultural College), *Animal Hus-*
bandry
 Manhattan

GRADUATE STUDENTS NOT WORKING TOWARD MASTER'S DEGREE

- Margaret Ann Blanchard, B. S. 1914 (Kansas State Agricultural College), *Music*
 Manhattan
 Myron Ralph Bowerman, B. S. 1909 (Michigan Agricultural College), *Mathematics*
 Manhattan
 Florence Carvin, B. S. 1913 (Kansas State Agricultural College), *English, Home Eco-*
nomics
 Wichita
 George Sidney Christy, B. S. 1909 (Kansas State Agricultural College)
 Howard
 Jennie Lynn Cox, B. S. 1913 (Kansas State Agricultural College), *Chemistry*
 Wichita
 Emma Philippine Doll, B. S. 1898 (Kansas State Agricultural College), *Music*
 Manhattan
 Frank Elmer Fox, B. S. 1915 (Iowa State College), *Chemistry*
 Manhattan
 Ivy Ann Fuller, B. S. 1913 (Kansas State Agricultural College), *Education*
 Manhattan
 Ray Gatewood, B. S. 1913 (Iowa State College), *Economics*
 Manhattan
 Edith Sara Glasscock, B. S. 1914 (Kansas State Agricultural College), *Education*
 Kansas City
 Mrs. Sue Smith Hunter, B. S. 1913 (Kansas State Agricultural College), *Economics,*
Gardening
 Manhattan
 Mildred Lee Inskeep, B. S. 1912 (Kansas State Agricultural College), *Music*
 Manhattan
 Edgar Keith, B. S. 1909 (Kansas State Agricultural College), *Music*
 Manhattan
 Helen McClanahan Keith, B. S. 1914 (Kansas State Agricultural College), *Music*
 Manhattan
 Vera Elma King, B. S. 1916 (Kansas State Agricultural College), *Education*
 Milo
 Phoebe Jane Lund, B. S. 1916 (Kansas State Agricultural College), *Domestic Art*
 Manhattan
 Nelle Irene McClurg, A. B. 1912 (University of Illinois), *Chemistry*
 Urbana, Ill.
 Homer McNamara, B. S. 1914 (Kansas State Agricultural College), *Agriculture*
 Manhattan
 Bodil Eleanor Mickelson, B. S. 1916 (Kansas State Agricultural College), *Education,*
Mathematics
 Lyndon
 Vivian Neiswender, B. S. 1916 (Kansas State Agricultural College), *Domestic Art, English,*
German
 North Topeka
 Harrison Eleanor Porter, B. S. 1907 (Kansas State Agricultural College), *Music*
 Manhattan
 Karl White Reed, A. B. 1913 (Miami University), A. M. 1916 (Ohio State University),
Chemistry
 Washington
 Nellie Evelyn Reed, B. S. 1914 (Kansas State Agricultural College), *Embryology, Music*
 Havensville
 Grade Ethelyn Rudy, B. S. 1916 (Kansas State Agricultural College), *English*
 Manhattan
 Bessie Laura Sheaff, B. S. 1914 (Kansas State Agricultural College), *Music*
 Kansas City
 John Earl Smith, A. B. 1912 (Indiana University), A. M. 1915 (University of Wisconsin),
Chemistry
 Manhattan
 Erwin Milton Tiffany, A. B. 1908 (Baker University), B. S. 1915 (Kansas State Agri-
 cultural College), *Horticulture*
 Manhattan

- Walter Edwin Tomson, B. S. 1912 (Kansas State Agricultural College), *German, Dairy*
Manhattan
Nola Treat, B. S. 1915 (Columbia University), *Journalism*
Manhattan
Edith Mary Walsh, B. S. 1916 (Kansas State Agricultural College), *Music*
Manhattan
Mamie Bell Wartenbee, B. S. 1916 (Kansas State Agricultural College), *History, Education*
Liberal
Lawrence Paul Wehrle, B. S. 1914, M. S. 1916 (Kansas State Agricultural College),
Advanced Embryology
Scranton
Edward Norris Wentworth, B. S. 1907, M. S. 1909 (Iowa State College), *Bacteriology*
Manhattan
Louis Coleman Williams, B. S. 1912 (Kansas State Agricultural College), *Agriculture*
Manhattan
Lucile Berry Wolf, B. S. 1913 (Kansas State Agricultural College), *Music*
Manhattan

SENIORS

AGRICULTURE

- | | |
|---|--|
| Henry Joseph Adams, Topeka | Harold William Luhnnow, Oak Park, Ill. |
| Charles Adamson, Erie | Roseoe Irwin MacMillan, Kansas City |
| *Harold Amos, Manhattan | Cecil Lyman McFadden, Stafford |
| *Bernard Martin Anderson, Manhattan | William Martin, Wathena |
| George Harold Ansdell, Jamestown | Lowell Martson Mason, Belle Plaine |
| *George Murray Arnold, Piedmont | Edgar Cruger Miller, Anthony |
| James Malcolm Aye, Manhattan | Herbert Proudft Miller, Kansas City |
| Ernest Baird, Minneapolis | Ben Moore, Manhattan |
| Lester Ford Barnes, Fontana | John Rogers Neale, Manhattan |
| Wood Bass, El Dorado | Alfred Nelson, Paola |
| *Henry Benjamin Bayer, Toronto | George Raymond New, Emporia |
| Luster Roy Brooks, Winfield | Arthur Reid Newkirk, Geneseo |
| Wesley Gordon Bruce, New York, N. Y. | *William O'Connell, Kiowa |
| Daniel Madison Bursch, Buffalo | Dean Orr, Kanona |
| Lewis Elven Crandall, Jr., Burlington | *Raymond Smith Orr, Manhattan |
| Blaine Crow, Manhattan | Robert Osborn, Jr., Wichita |
| Jay Howenstine Cushman, Emporia | Howard Waitman Phillips, Hutchinson |
| James Robert Dawson, Hays | William Francis Pickett, Manhattan |
| Frank Elsworth Dowling, Manhattan | Floyd M. Pickrell, Manhattan |
| Paul John Englund, Falun | Frank Irving Reynolds, Mulvane |
| Clarence Arnold Fickel, Manhattan | Lyle Vernon Rhine, Manhattan |
| *Irl Ferris Fleming, Manhattan | *Paul Robinson, Oswego |
| *Claude Fletcher, Hiawatha | *William Herbert Robinson, Holton |
| Ira Gordon Freeman, Ellsworth | Harry Weber Schaper, Mulvane |
| Samuel Ray Gardner, Hartford | Charles Louis Skelley, St. Paul |
| Otis Benton Glover, Circleville | *Emmett Warren Skinner, Manhattan |
| Wilbur Ross Gore, Manhattan | Elbert Lewis Smith, Soldier |
| Clarence Owen Grandfield, Maize | Ralph Robinold St. John, Wamego |
| Edward William Harvey, Parsons | Joseph Burton Sweet, Manhattan |
| Ferdinand Eugene Hayes, Louisville, Ky. | Clifford Levern Swenson, Lindsborg |
| Waldo Frederick Heppie, Wichita | *Byron John Taylor, Chapman |
| Lyman Ray Hiatt, Esbon | *Robert Emmett Terrill, Hays |
| Madison Lewelen Holroyd, Cedar Vale | Charles David Thomas, Baxter Springs |
| Frank Wilson Howard, Oakley | Lee Richard Thomas, Baxter Springs |
| Louis Edward Howard, Manhattan | Earl Chapman Thurber, Arkansas City |
| Carl Fountain Huffman, Tonganoxie | Frank Sumner Turner, Tonganoxie |
| Dwight Ellsworth Hull, Wolcott | *Sidney Rendall Vandenberg, Kan. City, Mo. |
| *Elmer Herman Jantz, Larned | *Glenn Frederick Wallace, Siloam Spgs., Ark. |
| *Donald Smith Jordan, Topeka | *Walter Harris Washington, Manhattan |
| Glenn William Keith, Belleville | Reed Weimer, Chapman |
| Floyd Brode Kelly, Kansas City | *Price Earlan Wheeler, Garden City |
| Charles Vincent Kershaw, Garrison | Wilton Terry White, Jewell |
| Ross Bartley Keys, Winchster | *Raymond Hazzleton Whitenack, Manhattan |
| *Robert Roy Lancaster, Manhattan | Wilbur William Wright, Newton |
| John Lawrence Lantow, Lyons | Wilhelm Alexander Wunsch, Argonia |
| Howard Allyn Lindsley, Manhattan | Ludwig Albert Zimmerman, Belle Plaine |

VETERINARY MEDICINE

- | | |
|----------------------------------|--|
| John Burton Barnes, Bellaire | Edward Adolf Schmoker, Interlaken, Swit- |
| *Richard Clay Chatman, Manhattan | zerland |
| Harve Frank, Jewell | Warren Robert Sheff, Haven |
| Daniel Milton Purdy, Manhattan | Harry Edwin Van Tuyl, Basehor |
| *Glenn Amiel Riley, Manhattan | Josiah Wistar Worthington, Richfield |

* Second division, class of 1916.

List of Students

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SENIORS—continued

AGRICULTURAL ENGINEERING

Frank Elmer Clark, Hamilton	Joe Anthony Novak, Ellsworth
Jefferson Harold Flora, Manhattan	

ARCHITECTURE

Samuel Edwin Barnes, Blue Mound	James Allison Hull, Stafford
Otto B. Githens, Republic	*Fred Albert Korsmeier, Nevada, Mo.
*Henry Robert Horak, Munden	Oliver Keith Rumbel, Moran
Lester Lawrence Howenstine, Manhattan	

CIVIL ENGINEERING

Thornton Fleming Bright, Manhattan	Roy William Haegel, Manhattan
Albert Clarence Bux, Meriden	Harry Ralph Johnston, Manhattan
Simon Edward Croyle, New Cambria	Guy Allegre Russell, Lakin
Andrew Earl Dyatt, Almena	Lorpaed Carl Teeter, Wamego
George Patterson Gray, Manhattan	Harry Tyrell, Topeka

ELECTRICAL ENGINEERING

George Andrew Cunningham, Cheney	William Charles McGraw, Manhattan
William Christoph Ernsting, Ellinwood	Fred Hemmant Nash, Farmington, Ark.
Carl David Hultgren, Topeka	Russell Harry Oliver, Oxford
Earl Kesinger, Greensburg	Paul Charles Rawson, Wamego
Rufus Stephen Kirk, Manhattan	Lester G. Tubbs, Manhattan
William Klooz, Manhattan	Leland Roy Varcoe, Wilsey
Paul Revier Lemly, Ramona	Carl Adolph Wallerstedt, Lindsborg
Robert Bruce Leydig, El Dorado	Horace Alfred Williams, Sylvan Grove

MECHANICAL ENGINEERING

Albert Cecil Arnold, Manhattan	Loren Little Lupfer, Larned
Charles Cotting Brown, Ellsworth	William Ewing Paterson, Yates Center
William Newton Caton, Manhattan	Gabe Alfred Sellers, Great Bend
Arthur Douglas, Manhattan	

HOME ECONOMICS

Helen Josephine Allis, Manhattan	Blanche Mary Haggman, Kackley
Essie Jane Anderson, Manhattan	Gertrude Hale, Lebanon
Edith Irene Andrew, Manhattan	Charlotte Barrett Hall, Chillicothe, Mo.
Blanche Baird, Manhattan	Mary Alma Hamaker, Scranton
Eunice Ann Baird, Cherryvale	Elizabeth Lillian Hargrave, Richmond
Rose Theodora Baker, Topeka	Zora Frances Harris, Manhattan
Mildred Gertrude Barnes, Rock Creek	Dorothy Louise Heartburg, Manhattan
Anne Estella Barnum, Simpson	Frances Hildebrand, Coffeyville
Myrtle Ethel Bauerfind, Minneapolis	Mabel Ellen Hinds, Manhattan
Lucy Van Baughman, Larned	Pearl Vivien Hinshaw, Argonia
Clara Merle Beeman, Topeka	Bess Ursula Hoffman, Enterprise
Martha Estella Blain, Manhattan	*Bertha Belle Hole, Manhattan
Mabel Luella Botkin, Manhattan	Esther Lydia Hostetler, Manhattan
Nelly Elizabeth Boyle, Spivey	Ellen Elizabeth Howell, Garnett
Anna Brandner, Burns	Mabel Marguerite Hunter, Manhattan
May Brookshier, Chillicothe, Mo.	*Ruth Amelia Hutchings, Manhattan
Hazel Elizabeth Brown, Chester, Neb.	*Agnes McCord Irwin, Manhattan
Esther Bruner, St. Joseph, Mo.	Pansy Mary Jackson, Manhattan
Hallie May Bryson, Manhattan	*Pearl LaClair Jacques, Manhattan
Lillian Anna Buchheim, Winkler	Celia Belletta Johnson, Dresden
Elizabeth Burnham, Kansas City	Inez Eggert Kent, Franklin, Neb.
Blanche Clark, Eskridge	Lelia May Kent, Franklin, Neb.
Rachel Clark, Eskridge	Marion Bell Keys, Enid, Okla.
Myrtle Antonia Collins, Essex, Iowa	Edith Gertrude Kinman, Ashland
Alva Lee Cooper, Olathe	Evelyn Nellie Kizer, Manhattan
Mary Ida Covert, Manhattan	Amy Alice Lamberson, Lyons
*Grace Lydia Currie, Manhattan	Lottie Lasswell, Havensville
Ruth Christina Daum, Eureka	Myrna Grace Lawton, Newton
Anna Dorothea Ernsting, Ellinwood	Emily Doris Lefnick, Manhattan
Florence Lissa Evans, Goshen, Ind.	Lillian McCarty, Iola
Rosanna Farquhar, Manhattan	Agnes May McCorkle, Holton
Christina Grace Figley, Kansas City	Vera Anna McCoy, Imperial, Neb.
*Nelle Flinn, Admire	Louisa McIntosh, Lost Springs
Grace Gardner, Hartford	Beulah Lillis McNall, Gaylord
Dorothea Pearl Gish, Manhattan	Elsie Beth Marshall, Clifton
*Gladys Gist, Manhattan	Kittie May, La Cygne
Altha Teresa Goodwyn, Minneapolis	Charlotte Mayfield, San Marcos, Texas
Stella Jane Gould, Wilrods	*Marie Moses, Manhattan
Gladys Mae Grove, Eureka	Laura Mueller, Wichita
Dorothy Etta Hadley, Topeka	Anna Monroe Neer, Cambridge

* Second division, class of 1916.

SENIORS—continued

Ellen Evelyn Nystrom, Wellington	Frieda Wilhelmina van der Smissen, Newton
Clara Viola Peterson, Essex, Iowa	Ellen Delpha Speiser, Garnett, Colo.
Hazel Luella Pierce, Severy	Viola Stockwell, Larned
Alma Luella Pile, Arkalon	Alice Mae Sweet, Burlington
Nellie Pope, Hoxie	Corinne Pearl Sweet, Holton
Nina Mae Powell, Athol	Alta Carol Taylor, Wichita
Jessie Fern Preston, Wichita	Edith Tempero, Clay Center
Elizabeth Quinlan, Manhattan	Madge Rector Thompson, Hill City
Laura Mary Ramsey, Topeka	Adelaide Rebecca Updegraff, Maple Hill
*Juanita Reynolds, Canton	Charlotte Pearl Wartenbee, Liberal
Mildred Robinson, Salina	Mary Elizabeth Weible, Topeka
Fern Martha Roderick, Attica	Vida Neil Wilson, Formoso
Mabel Letitia Root, Centralia	Winnie Fay Wilson, Formoso
Helen Hays Ruhlandt, Osawatomie	Fay Emma Wright, Muskogee, Okla.
Hazel Etta Russell, Wichita	Matilda Louisa Ziller, Manhattan
*Margaret Ursula Schneider, Logan	

GENERAL SCIENCE

Lois Viola Bellomy, Manhattan	Keith Egleston Kinyon, Vernon
James Senter Brazelton, Wathena	Riley Edward McGarraugh, Mulvane
Harry Ray Bryson, Manhattan	Harrison Mitchell, Sterling
Loring Enner Burton, Manhattan	Wallace Park, Manhattan
Charles Elbert Curtis, Manhattan	Vera Grace Peake, Belleville
Vilona Cutler, Anthony	John Sellon, Kansas City, Mo.
Lewis Albert Dubbs, Ransom	*Harry Fred Vaupel, New Cambria
Ralph Edson Duff, Walton	*Lyndell Porter Whitehead, Walnut
Stella Maude Harriss, Fairbury, Neb.	Vera Whitmore, Manhattan
Anna Howard, Manhattan	Nina Marie Williams, Winfield
Philip Alexander Kennicott, Woodbine	

INDUSTRIAL JOURNALISM

Ralph Harold Heppie, Wichita	Leo Clifford Moser, Courtland
*Albert Ellis Hylton, Manhattan	*Annette Woodward Perry, Manhattan
Erba Mona Kaul, Glen Elder	Harold Wyllis Snell, Manhattan

JUNIORS

AGRICULTURE

Leon Godfrey Abele, Holton	William Raymond Essick, Eureka
Philip Asa Barnes, Blue Mound	Morris Evans, Topeka
Sherman Floyd Bell, Perry	Ward Willard Fetrow, Haddam
James Martin Belwood, Marshall, Mo.	Albert Edward Fincham, Pratt
Everett Allen Billings, Maple Hill	Paul Levi Findley, Manhattan
Dee Daniel Bird, Great Bend	Edward Raymond Frank, Manhattan
Hobart McNeil Birks, Hays	George Adam Franz, Rozel
Frank Otto Blecha, Severy	William Paul Gaiser, Wichita
George Adam Bolz, Topeka	George Calvin Gibbons, Topeka
Chester Bondurant, Ness City	Howard M. Gillespie, Danville
Orville Thomas Bonnett, Winfield	Theophilus Mosher Glenn, Tarkio, Mo.
Donald Jacobs Borthwick, Great Bend	Frank A. Goranson, Randolph
Curtis Angel Brewer, Abilene	Fred Griffie, Winfield
William Harrison Brookover, Eureka	Albert William Griffith, Barnard
William Herbert Brooks, Stafford	Benjamin Franklin Griffin, Manhattan
Raymond Campbell, Parsons	Frank Harold Gulick, Winfield
James Carle, Gretna	Ford Haggerty, Greensburg
Fred Carp, Manhattan	Benjamin John Hahne, Dodge City
Joseph Earl Chaffee, Kansas City, Mo.	W. Carleton Hall, Coffeyville
Jerome Davis Chapman, Pratt	Floyd Perry Hamill, Colby
Robert Earl Cleland, Manhattan	Albert Cecil Hancock, Stanley
Harry Colglazier, Larned	Clarence Harris, Havensville
John Burnard Collister, Manhattan	Jesse Edmond Harrold, Manhattan
Merle Warren Converse, Manhattan	Burtis Emerson Heacock, Attica
Robert Francis Copple, Glasco	Carl Laurence Hedstrom, Dinas
David Earl Curry, Dunevant	George Randolph Hewey, Wichita
William Davis Denholm, Tonganoxie	Douglas Abijah Hine, Manhattan
Percy LeRoy Depuy, Girard	Harold Irving Hollister, Quincy
Harry Hazelton Dinsmore, Chrisman, Ill.	Walter Wynne Houghton, Emporia
John Elwyn DuBois, Wichita	Carl Lewis Howard, Oakley
John Frederick Eggerman, Manchester, Okla.	Lea Nathan Jewett, Burlington
John Burton Elliott, Manhattan	Charles Otis Johnston, Harper
John Francis Ellis, Pratt	Robert Warren Kilbourn, Sterling
Ebenezer Torrey Englesby, Manhattan	Denzel Isaac McDowell, Emporia
Charles Ranger Enlow, Harper	George Ward McVicar, Onaga

* Second division, class of 1916.

JUNIORS—continued

Donald Eugene MacLeod, Holton	Glenn Charles Salisbury, Hays City
Avery Cleveland Maloney, Kalamazoo, Mich.	Loyal K. Saum, Norton
George Edwin Manzer, Corpus Christi, Tex.	Silvey West Scott, Larned
Frederick Albert Marhofer, Hammett, Idaho	Arthur Shauer, Los Angeles, Calif.
Ralph Waldo May, Williamstown	Simon Peter Shields, Lost Springs
Chester Howard Middleton, Caldwell, Tex.	Ira John Shoup, Udall
John Russell Mingle, Holton	Francis Aloysius Slattery, Jewell
Samuel M. Mitchell, Kansas City, Mo.	Henry Edwin Smith, Manhattan
Samuel James Molby, Baldwin	Giles Sullivan, Wamego
Russell V. Morrison, Sterling	Edwin Eugene Summers, Kingman
Ralph Landis Mosier, Muskogee, Okla.	Joseph Earl Taylor, Manhattan
Harry Hibbard Nelson, Wakarusa	Earl Hicks Teagarden, Wayne
Peter Leatherman Netterville, Manhattan	Eugene Field Tebow, Jamestown
Lloyd Vernon Oglevie, Burr Oak	Orin Milton Thatcher, Manhattan
Dustin Glenville O'Harro, Manhattan	William Henson Thomas, Emporia
Glenn William Oliver, Howard	George Titus, Harper
Vernon Emery Paine, Admire	Frank VanHaltern, Manhattan
John Thomas Pearson, Parsons	Glen Chase Ware, Larned
Benjamin Rankin Petrie, Pratt	Don Carol Warner, Arlington
Telford Ruddell Pharr, Manhattan	Sheppard Arthur Watson, Eudora
Ira Lewis Plank, Sylvia	Willard Welsh, Newton
Ernest Henry Ptacek, Emporia	Fred B. Wenn, Erie
Ralph Anson Randall, Wichita	Jesse Augustus White, Willis
Lee William Randels, Anthony	Embry Lloyd Williams, Bigelow
Harry DuMont Reed, Larned	Joseph Myles Williams, Osage City
Chester Lee Reeve, Garden City	James Earl Williamson, Topeka
George Wilson Rhine, Manhattan	Jay Roy Wood, Reading
Carl John Rodewald, Vassar	Herman Henry Zimmerman, Belle Plaine
Orvid Vante Russell, New Albany	

VETERINARY MEDICINE

Charles Washington Bower, Perry	Charles Francis Layton, Blue Rapids
John Lewis Campbell, Manhattan	Carleton Glen Libby, Glen Elder
Clayton Bronaugh Griffiths, Baileyville	Thomas O'Reilly, Manhattan
Frank King Hansen, Manhattan	Oscar Willy Felix Paulsen, Manhattan
Nathan Daniel Harwood, Agra	Sam Smith, Syracuse, Neb.
Walter Harold Hiltz, Kansas City	Lyman Rae Vawter, Manhattan
Jackson Benjamin Hinds, Manhattan	David Wooster, Emporia
Charles Henry Honeywell, Poe	

AGRICULTURAL ENGINEERING

Herbert John Helmkamp, Newton	George Aaron Miller, Portis
Paul Mann, Manhattan	Perie Richmond Pitts, Manhattan
Ralph Mickle, Crete, Neb.	

ARCHITECTURE

Arthur Hayes Brewer, Manhattan	Myron Ernest Johnson, Olathe
Lester Gould Hudson, Winchester, Mo.	Theodore Legrand Shuart, Hutchinson

CIVIL ENGINEERING

Harry Dunham, Atchison	Ira Rogers, Lyndon
Elmer B. Johnson, Cheney	Frank Miller Sisson, Gretna
Robert Kerr, Jr., Wakefield	Wallace Lynn Thackrey, Valentine, Neb.
Clyde Cicel Key, Wichita	Charles Forrest Zeigler, Manhattan
William Axtell Norman, Beaumont, Tex.	

ELECTRICAL ENGINEERING

Leland Golden Alford, Council Grove	Yueu Foo Lim, Canton, China
Lowell Edwin Baldwin, Garnett	Dilts Sprinkle McHugh, Bucklin
John Edmund Bixby, Osawatomie	Leroy Nelson Miller, Carthage, Mo.
Paul Adelbert Carnahan, Manhattan	Ohmer Roger Miller, Norton
Fabian Caleb Dickinson, Topeka	Joseph Lloyd Puckett, Partridge
Merrill Augustus Durland, Centralia	Marshall Howard Russell, La Crosse
George Wilbur Fisher, Sedalia	Flavel Theodora Scriven, Lucas
Ralph Emerson Franklin, Horton	Martin Hayden Soule, Independence
Robert Albert Graves, Abilene	Ralph Andrew VanTrine, Salina
Olind Arthur Hindman, Rush Center	Carey Ray Witham, Manhattan

MECHANICAL ENGINEERING

Harry Earl Bell, Wichita	Lee Victor Haegert, Randall
Trafford William Bigger, Topeka	George Hamilton, Manhattan
James Irwin Brady, Manhattan	Andrew Milton Harvey, Ransom
John Oakley Carter, Garden City	Ivor Orin Mall, Manhattan
Charles Kenneth Champlin, Manhattan	Lyman Ray Rees, Talmage
Donald E. Dewey, Fort Scott	Roscoe Noyes St. John, Rocky Ford, Colo.
Charles Anthony Frankenhoff, Atchison	Lawrence Artman Tilton, Garrison
William Walter Frizell, Larned	Ezra Taggart Whitcomb, Cedar Point

JUNIORS—continued

HOME ECONOMICS

Estella Mae Albin, Grainfield	Mildred Elma Kelly, Olathe
Mame Gertrude Alcott, Colby	Frances Leone Keneaster, Kansas City, Mo.
Ruth Helen Allen, Elmdale	Lillian Sarah Kennedy, Winfield
Bertha Caroline Anderson, Kinsley	Margaret Belle King, Manhattan
Maude Strong Anderson, Gas	Elizabeth Emily Kirkpatrick, Manhattan
Ethel May Arnold, Manhattan	Mollie Lindsey, Wellington
Madge Gladys Austin, Manhattan	Lucile Lockwood, St. Francis
Florence Willetta Baird, Cherryvale	Ruth Lyon, Emporia
Mildred Mary Barackman, Howard	Georgia Frances McBroom, Barnes
Mildred Edith Batchelor, Manhattan	Mae McCabe, Onaga
Enid Alta Beeler, Mankato	Louella Elizabeth Margaret McCall, Wakeeney
Irma Elizabeth Boerner, Colby	Katharine Hampton McFarland, Topeka
Irene Dale Brooks, Parsons	Lelia Ruth McMurry, Darlow
Flossie Leona Brown, Garden City	Gertrude McQuaid, Fairbury, Neb.
Jennie Pearl Brown, Caldwell	Alpha McVey, Hill City
Kathryn Velma Browning, Chanute	Elva Ione Mall, Manhattan
Mildred Browning, Linwood	Veda Margaret Mann, Gallatin, Mo.
Genevieve Vador Bruce, Manhattan	Hildegard Althea Mense, Kansas City, Mo.
Hattie Avis Bryan, Pratt	Hazel Alsesta Merillat, Enterprise
Edna Halce Butler, Marysville	Katherine Miller, Abbyville
Evangeline Casto, Wellsville	Florence Eleanor Mitchell, Kansas City, Mo.
Quinta Pearl Cates, Manhattan	Helen Mitchell, Manhattan
Florence Angela Clarke, Junction City	Harriett Plummer Morris, Wichita
Anna Viola Collins, Essex	Elizabeth Glenday Mortimer, Delphos
Nelle Lucile Cordts, Overbrook	Buena Myers, Clay Center
Blanche Marie Crandall, Manhattan	Comfort Amanda Neale, Manhattan
Helen Crane, Kansas City, Mo.	Margaret Alice Neiman, Whitewater
Fava Marie Criner, McPherson	Bella Marie Nelson, Jewell
Effie Clawson Cross, Manhattan	Dorothy Elizabeth Norris, Topeka
Mary Dahl, Montrose	Edna May Oetinger, Parsons
Mary Dakin, Ashland	Amanda Christine Olson, Brookville
Alice Virginia Dawson, Belleville	Dorothy Jane Parke, Emporia
Margaret Caroline deGraff, Holton	Edith Parkhurst, Kinsley
Bess Mae Denman, Clifton	Golda Lucille Rader, Manhattan
Susan Grace Dickman, Fostoria	Ora Ann Randels, Anthony
Hattie Estelle Droll, Wichita	Edna Irene Rawlings, Eureka
Emma Juanita Engle, Abilene	Edith Jeanette Reed, Genoa, Ill.
Edith Genevieve Findley, Manhattan	Stella May Rich, Webb City, Mo.
Lenore Josephine Fredrickson, Essex, Iowa	Pauline Richards, Delphos
Gladys Elizabeth Gall, Spring Hill	Hazel Irene Richardson, Dunavant
Muri Gann, Springfield, Mo.	Letha Elizabeth Richhart, Nickerson
Annamae Garvie, Abilene	Ruth Myrtle Ridley, Topeka
Helen Rae Garvie, Abilene	Mabel Edith Roberts, Marysville, Mo.
Mildred Anna Geitgey, Anthony	Edith May Robinson, Atwood
Rosalie Syena Godfrey, Holton	Margaret Robinson, Soldier
Bess Lenora Gordon, Garden City	Cleo Prudence Roderick, Attica
Maude Rosaleen Greub, Kirwin	Annie Ryan, Manhattan
Elsie May Griffin, Nickerson	Maud Ernestine Sjolander, Topeka
Florence Gladys Guild, Topeka	Dorothy Skinner, Springfield, Mo.
Daisy Arminta Hall, Speed	Gladys Marie Spring, Bern
Kathleen Mildred Hamm, Humboldt	Frances Elizabeth Stall, Kansas City
Helen Hope Harbaugh, Minneapolis	Helen May Stewart, Spearville
Oneita Leone Harrison, Wichita	Ursula Mae Stites, Hope
Florence June Hawkins, Topeka	Esther Elizabeth Stonge, Riley
Alene Bernice Hibarger, Wichita	Stella Strain, Phillipsburg
Esther Ellene Higgins, Hiawatha	Rose Elizabeth Straka, McPherson
Esther Gladys Hilbish, Lewis	Iva Viola Strebel, Alton
Leona Mae Hoag, Mankato	Girlye Strowig, Paxico
Lora Marian Hoag, Manhattan	Ethel Gladys Switzer, Emporia
Gladys Evelyn Hoffman, Manhattan	Bess Thomen, Junction City
Mabel Donna Howard, Cottonwood Falls	Magdalen Florence Thompson, Alma
Grace Pearl Howell, Norton	Mary Belle VanDerveer, Kingman
Ruth Kathrina Huff, Chapman	Sara Bunitta Richardson Vincent, Kansas City
Evelyn Humphreys, Manhattan	Lelia Faye Whearty, Westmorland
Nellie Elizabeth Hunt, Manhattan	Julia May White, Manhattan
Mary Helen Hunter, Anthony	Nellie Wilkie, Abilene
Beatrice Troxel Hurd, Nickerson	Donna Faye Wilson, Wichita
Florence Gertrude Jewell, Goodland	Bernice Hale Wise, Pawnee Rock
Beulah Amelia Johnson, Sterling	Margaret Joan Worland, Seneca
Anna Marie Johnston, Manhattan	
Exie Lee Kelly, Manhattan	

GENERAL SCIENCE

John William Barker, Pratt	John Wirt Blachly, Manhattan
Benjamin Francis Barnes, Fontana	Helen Margaret Boyd, Norton
Oliver Frederick Barnhart, Kansas City	Lola May Chaffee, Bazine
Lulu Maude Berger, Sylvan Grove	Cecil Orr Chubb, Baxter

JUNIORS—continued

Roy Kiefner Durham, Anthony	Frances Perry, Manhattan
Bertha Claire Ellsworth, Manhattan	Zeno Clifford Rechel, Hutchinson
Gladys Irene Garnard, Wellington	Clifford Rude, Council Grove
Alfred Alexander Grant, Denton, Tex.	Lloyd Emerald Souders, Manhattan
Myrtle Johnson, Manhattan	Arthur Bradley Sperry, Neodesha
Robert Hezekiah Kidd, Dayton, Ohio	John Thomas Steele, jr., Manhattan
Sarah Katrina Kimport, Dellvale	Arthur Walker, Manhattan
Zenith Mullen, Labette	Eva Emmaline Wood, Manhattan
John William Musil, Blue Rapids	Philip Hsun Young, Hungchow, China

INDUSTRIAL JOURNALISM

Mrs. Martha Tunstall Bonnett, Manhattan	Lillie Elise Lehman, Junction City
Arthur William Boyer, Scranton	Sarah Erwin McLean, McPherson
Edna Lily Boyle, Spivey	Marion Nelle Quinlan, Manhattan
Cleve Somerset Briggs, Parsons	Balford Quinton Shields, Lost Springs
William Kamp Charles, Republic	Elizabeth Doris Wadley, Manhattan
Hugh Bryon Dudley, Kansas City	Edward David Wells, Wichita
Floyd Hawkins, Manhattan	Marshall Parrish Wilder, Douglass
Charles Warren Hestwood, Wichita	Helen Lathrop Winne, Paducah, Ky.

SOPHOMORES

AGRICULTURE

Clarence Pat Allen, Coffeyville	Malferd N. Hendrickson, Manhattan
Glen Allen, Burlington	Francis Augustin Hennessy, Fulton
Fred Denmen Allison, Hazelton	Homer Henney, Horton
James Bell Angle, Courtland	Ivan Walter Herriott, Garden City
William Allen Atchison, Topeka	Glenn Frank Hicks, Norton
Emmet Stanley Bacon, Emporia	Earl Martin Hiestand, Yates Center
Herbert Nickson Baker, Tonganoxie	Clara E. Higgins, Hiawatha
William Aaron Ball, Coffeyville	R. Reginold Hinde, Manhattan
Turner Barger, Protection	Orin Willard Hinshaw, Eureka
Carroll Mueller Barringer, Conover, N. C.	Dalton Ray Hooton, Garnett
Elmer Eugene Bates, Perry	Azel Lemon Husted, Codell
W. Walton Bell, Beattie	Samuel James, Riley
George Yoeman Blair, Mulvane	William Curtis Janssen, Lorraine
Raymond H. Blair, Blue Rapids	Arthur Norman Jones, Manhattan
William Blakely, Neodesha	Horace Lynden Kapka, Kansas City
Joseph Alvin Bogue, Manhattan	Kurt Herman Kecker, Frederick
Mark Lee Borror, Manhattan	Clede Rex Keller, Manhattan
William Henry Borland, Clay Center	Daniel Adelbert Kemper, Denison, Tex.
Hiram Sanford Bottenfield, Joplin, Mo.	John Harold Kerr, Kinsley
Fred William Boyd, Joplin, Mo.	Clara Kimport, Dellvale
Duke Daniel Brown, Marysville	Russell Lake, Lake City
Joseph Edgar Cassidy, Manhattan	Ira Kauli Landon, Oklahoma City, Okla.
Edwin Romick Chandler, Argentine	Ernest Cyril Lindholm, Cheney
Clarence B. Chapman, Manhattan	Frank M. Lindsey, Bunker Hill
John A. Clarke, Manhattan	Elmer David McCollom, Bogard, Mo.
Alfred Osborn Cole, Topeka	Ernest Lee McIntosh, Manhattan
Arthur Bright Collom, Maressa, Ill.	Emanuel Jesse Maninger, Harper
Arthur Everett Cook, Russell	Carroll Dean Marquis, Manhattan
Joseph Hamilton Cool, Glasco	Schuyler Bailey Marshall, Dallas, Tex.
Harold Robert Cozine, Linn	Edgar Martin, Siloam Springs, Ark.
Warren Eugene Crabtree, Manhattan	Donald Clarence Meacham, Roby, Ill.
Vernon Simpson Crippen, Langdon	Ralph Bertram Medlin, Manhattan
Rex McCombs Criswell, Hartner	Albert Metz, Anthony
Claude Brownley Cross, Manhattan	John Delmont Montague, Anthony
Miles Ellsworth Crouse, Harlan	Bryan Moore, Manhattan
Kenneth Robert Crow, Kansas City	Harry Allyson Moore, Manhattan
Charles Frederick Croyle, New Cambria	Joseph Clare Morton, Bunker Hill
Price Jones Davies, Arkalon	Manoog Mugerdtich Mugerdtichen, Man-
Arthur Reginald Denman, Manhattan	hattan
Fred Hollister Dodge, Manhattan	Arthur Leroy Myers, Windom
Claudius Neil Dulaney, Winfield	Jesse Bowman Myers, Milton
Roy Elmer Einsel, Greensburg	Ralph Dale Nichols, Scranton
Leo Bertrum Elliott, Logan	Charles Nitcher, Hardy, Neb.
Abijah Wilcox Foster, Fairchild, Wis.	Ralph Damen Nixon, Council Grove
Blanch Shirley French, Hamilton	Floyd Earl Oakes, Gypsum
Henry Gilbert Gentry, Winfield	Richard Harry Parsons, Arkansas City
Bernie Edward Gleason, Jerico, Vt.	Nevels Pearson, Manhattan
Edwin Edgar Gottman, Kansas City	Orin Ros Peterson, Caney
Lewellen Goodrich Griffing, Topeka	Everett Jacob Price, Baileyville
Luke Albert Guilfoyle, Wamego	Claude Elmer Prock, Manhattan
Joe Cunningham Gullede, Manhattan	William Robert Pryor, Fredonia
Edwin Ray Gunn, Great Bend	Leo Dewey Ptacek, Emporia
Clinton DeWitt Guy, Kansas City, Mo.	Ollie William Reed, Norton
Clyde Russell Hemphill, Chanute	

SOPHOMORES—continued

Laurens H. Keyburn, Leavenworth	Francis Totten, Beattie
Harold Wortman Richards, Manhattan	Carl Fenton Trace, Cartersville, Mo.
Francis Lorenzo Rimbach, Broughton	Mark Florea Upson, Sabinal, Tex.
Louis Vernon Ritter, Memphis, Tenn.	Baxter Vandiver, Bluffton, Ark.
Louis Henry Rochford, Osborne	Carl McLain Vermillion, Tescott
Carl Otto Roda, Paradise	George Henry Washburn, Spivey
Robert Elias Romig, Topeka	Ralph Scoles Westcott, Galena
Winfred Foster Runyen, Topeka	Carl Wettig, Valley Falls
Rex Brown Schnatterly, Kinsley	Rupert Kress Wey, Wichita
Elmer Houser Schultz, Manhattan	Edwin Frederick Whedon, Oswego
Clarence Milton Sigler, Baileyville	Albert Edgar Wilson, Kinsley
David Loyd Signor, Manhattan	Ivan Alfred White, Winfield
John Albert Sims, Americus	Gilbert Clark Whitsitt, Manhattan
Karl Knox Snyder, Norton	Claude Merlin Willhoite, Manhattan
Oscar Steanson, Oklahoma City, Okla.	Homer Bryon Willis, Manhattan
Ralph Earnest Steffe, Sedgwick	David Albert Wilson, Broken Arrow, Okla.
Charles Harold Stinson, Carlyle	Frank C. Wilson, Manhattan
Forrest Ransom Stone, Stafford, Mo.	Harbard Stephen Wise, Wichita
Ray Allen Stratford, El Dorado	Theodore Franklin Yost, La Crosse
Arthur Fretchhof Swanson, Norcatur	Fred Frank Young, Pendennis
Fred Losey Taylor, Columbus	

VETERINARY MEDICINE

Harry Jonas Austin, Manhattan	Howard O'Brien, Luray
Edgar Hugh Barger, Smith Center	Roy Reece Parker, Clearwater
Arthur Esco Bate, Wichita	William Pfaff, Hazelton
Fred Robert Beaudette, Wichita	Evan Hart Richardson, Circleville
James Joshua Black, Cartersville, Mo.	Hugh Eleanor Rippey, Emporia
Russell Fesler Coffey, Iola	Chauncey Elias Sawyer, Carlyle
Fred Emerson, Ottawa	August Ernest Schattensburg, Manhattan
John Franklin Erdley, Holton	Edward Henry Schroer, Manhattan
John Fredenberg, Council Grove	Gail Maurice Umberger, Elmdale
Howard Lewis Gingery, Pawnee City, Neb.	Ray Weinheimer, Ottawa
Francis Norwood Jordon, Manhattan	Charles Edward Zollinger, Junction City
Edward Luke McCartan, Cripple Creek, Colo.	

AGRICULTURAL ENGINEERING

Lloyd Harmon Bunnell, Iola	Leo Elmer Swenson, Lindsborg
Walt Ellwood Dickerson, Wichita	John Titus, Harper
Torby Glenn Fletcher, Wichita	

ARCHITECTURE

Edith Loree Kelly, Olathe	Keen Umbehr, Alma
Harold Fred Laubert, St. Joseph, Mo.	Shelby Marsh Woods, Wichita
Ray Selden Talley, Harper	

CIVIL ENGINEERING

Edwin Adee, Manhattan	Raymond Ellsworth Means, Protection
Hugh Donald Barnes, Blue Mound	Lloyd William Roberts, Pomona
Lawrence Harold Bixby, Manhattan	Edward John Stahl, Manhattan
Charles Leroy Caldwell, Manhattan	Frank Elbert Whipple, Manhattan
Henry Cornell, Wakefield	John Vincent Wiebeler, Lawrence, Neb.
Jesse George Falkenstein, Onaga	Keith Lyle Zeigler, Hutchinson
Paul Watson Houston, Syracuse	

ELECTRICAL ENGINEERING

Harold F. Allison, Great Bend	Samuel Willet Honeywell, Poe
Joseph Leslie Balderston, Dodge City	Hope Forrester Jenkins, Kingman
Joseph Parker Ball, Independence	Clifford Frederick Joss, Topeka
Ernest Leo Bebb, Reading	Joe Wheeler McCoskrie, Dighton
Cecil Lloyd Bower, Mound City	Glenn Worth McCracken, Manhattan
Raymond Lewis Carleton, Great Bend	William Alfred Nye, Belle Plaine
Vernon Grant Coleman, Sharon	John Stephen Painter, Beverly
Jesse Alfred Cook, Eureka	John Henry Reed, Seward
Homer Cross, Wichita	Herbert Gordon Schultz, Manhattan
Ray Franklin Glover, Wamego	Chester Cash Shelhammer, Fowler
John C. Goodale, Smith Center	Morton Stigers, Manhattan
Robert Earl Goure, Lincoln	Lloyd Birch Vorhies, Alva, Okla.
John Spencer Gullede, Siloam Springs, Ark.	Errol Thomas Williamson, Independence, Mo.
Joseph Elbert Helt, Winfield	Paul Benjamin Winchel, Parker

List of Students

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SOPHOMORES—*continued*

MECHANICAL ENGINEERING

James Hill Branham, Pittsburg	Stanley Paul Hunt, Marysville
Miller Livingston Coe, Manhattan	Clarence Huycke, Ellsworth
William Henry Curtis, Ogden	James Wilburn Johnson, Kansas City
Oscar Nuten Davis, Altamont	George Albert Kauffman, Coffeyville
Hubert Alonzo Dawson, Topeka	Dan Glenn Lake, Lake City
Ray Bowles Eck, Mulvane	John Lewis Mickle, Crete, Neb.
Carl Frederick Errebo, Vesper	Clifford Howard Myers, Hutchinson
James Lough Estlock, Greensburg	Zenas Arthur Nevins, Dodge City
Hobart Fairman, Manhattan	Carew Henry Sanders, Manhattan
Siebert Fairman, Manhattan	Donald Carman Servis, Rock
Otto Franklin Fisher, Sedalia, Mo.	Orloe Denzil Small, Independence
Dewey Mason Fullington, Idana	James R. Sparks, Kiowa
Gordon Wilfred Hamilton, Salina	Arleigh Lyle Willis, Manhattan
Claude Gustave Hansen, Sedgwick	

HOME ECONOMICS

Alta' Mae Adams, Lyons	Greta Hazel Gramse, Perry
Elizabeth Adams, Maple Hill	Mamie Grimes, Manhattan
Cora Barbara Akers, Conway	Myrtle Annice Gunselman, Wakefield
Pearl Eva Althouse, Ottawa	Eva Maud Gwin, Morrowville
Myrtle Margaret Anderson, Kingman	Mary Frances Haack, Florence
Sarah Virginia Apperson, Lincoln, Neb.	Lucile Halleck, Abilene
Mary Kathryn Ashbrook, El Reno, Okla.	Alice Tibbetts Harkness, Lakin
Alyce Bacon, Emporia	Mary Lavina Hart, Centralia
Helen Hunt Bayles, Manhattan	Eva Harvey, Osborne
Ida May Bare, Protection	Sarella Lucile Herrick, Topeka
Ivyl Constantine Barker, Newton	Marie Flora Hill, Lubbock, Tex.
Esther Grace Bayles, Manhattan	Edna Letha Hoke, Manhattan
Edna Louise Beckman, Manhattan	Mable Amanda Howard, Manhattan
Gladys Bergier, Manhattan	Lettie Leona Jeffrey, Elmdale
Mildred Content Berry, Jewell	Gussie Christina Johnson, Wichita
Lulu Eliza Beverly, Manhattan	Mary Catherine Johnston, Gardner
Edith Frances Biggs, El Vado, N. M.	Geraldine Wanda Jones, Leavenworth
Sibyl Irene Blackburn, Eureka	Maude Emily Kershaw, Garrison
Helen Willamine Blank, Emporia	Mary Elvessa Kirkpatrick, Holdrege, Neb.
Sarah Anna Boell, Riley	Evalent Virginia Kramer, Washington
Fayne Vera Bondurant, Ness City	Elizabeth Ann Lacy, Marshall, Mo.
Elsie Bonney, Manhattan	Alpha Corrine Latzke, Manhattan
Ruth Borthwick, Manhattan	Esther Naomi Latzke, Manhattan
Eda Mae Bradley, Blue Mound	Grace Eleanor Lightfoot, Manhattan
Berna Mairae Brown, Manhattan	Letta Dorothy Lisk, Lenexa
Margaret Browne, Burdett	Lois Emily Litchfield, Blackwell, Okla.
Ravena Elizabeth Brown, Lawrence	Lucille Carol Logan, Lyons
Phyllis Harriet Burt, Eureka	Olive Charlotte Logerstrom, Manhattan
Lois Ava Burton, Emporia	Dorothy Elizabeth Lush, Altamont
Gaytha Esther Campbell, Goodland	Effe Evelyn Lyons, Topeka
Helen Juanita Carey, Manhattan	Cynthia Ellen McGuire, Manhattan
Lucile Margaret Carey, Manhattan	Helen McIlrath, Manhattan
Vera Cates, Manhattan	Irma Ellen McKinnell, Maize
Catherine Aleph Christman, Wichita	Helen Charlotte McLean, Wichita
Ethel Laura Cloud, Frankfort	Marie Manser, Burden
Sarah Alda Conrow, Manhattan	Mary Aletha Mason, Belle Plaine
Alice Janet Counter, Enterprise	Laura Marie Maxwell, St. Joseph, Mo.
Maude Maurice Coverdale, Coffeyville	Elizabeth Cora May, Holton
Lida Mary Crawford, Lincoln	Tressie Edna May, Manhattan
Margaret Elizabeth Crumbaker, Onaga	Lora Gertrude Mendenhall, Fairbury, Neb.
Mary Grace Crumbaker, Onaga	Mabel Ruth Menoher, Gravity, Iowa
Louise Dawson, Clifton, Ariz.	Nina Irene Miller, Neodesha
Maude Elizabeth Deely, Norton	†Flossie Milleson, Oberlin
Marguerite DeMoss, Stanberry, Mo.	Mary Ethel Mitchell, Hymar
Florence Lillian Dial, Manhattan	Emma Elizabeth Moore, Syracuse
Minnie Josephine Dubbs, Ransom	Hilda Ruth Moore, Winfield
Leonore Maria Edgerton, Randolph	*Margery Lucile Moore, Manhattan
Elizabeth Rose Edgington, Burlingame	Ruth Ann Morgan, Neodesha
Ruby Anna Ellerman, Potter	Hazel Blanche Morris, Grenola
Alma Ruth Ennefer, Pleasanton	Esther Raye Nachman, Kansas City, Mo.
Nellie Jane Farrish, Palco	Bertha Christene Nelson, Lindsborg
Maurine Fitzgerald, Colby	Lenora Barbara Nicolay, Manhattan
Bertha Edna Flynn, Humboldt	Mamie Adelaide Norlin, McCracken
Marie Gehr, Manhattan	Lulu Grace Norton, Cottonwood Falls
Hattie Pauline Gesner, Kiowa	Vera Oviatte Olmstead, Moran
Helen Isabell Gott, Arlington	Esther Dora Olson, Brookville
	Mary Iza Potter, Clifton

† Housekeepers' course, fall and winter terms.

* Deceased.

SOPHOMORES—*continued*

Doris Hawthorne Prickett, Wamego	Ruth Elizabeth Thomas, Anthony
Edna Winifred Pyle, Morrill	Lola Evelyn Tipton, McPherson
Mary Ann Redden, Manhattan	Lois Tucker, Elkhart
Emma Cordelia Richards, Manhattan	Gertrude Uhley, Fairbury, Neb.
Ruby Maude Roberts, Lyons	Mary Laura Vaile, Junction City
Maybell Rodgers, Cherryvale	Myrtle Cornelia Vanderwilt, Solomon
Frances Elizabeth Russell, Scott City	Sybil June Marie Watts, Winfield
Vera Leone Samuel, Paola	Martha Coats Webb, Caney
Adelaide Seeds, Topeka	Bula Mae Wertenberger, Manhattan
Nellie Gladys Shoup, Mulvane	Edythe May Wilson, Luray
Mildred Marie Shugart, Ottawa	Cora Winget, Jennings
Lola Mae Sloop, Manhattan	Mary Winningham, El Reno, Okla.
Meda Smies, Clifton	Daisy Cooline Wiseman, Manhattan
Mollie Manerva Smith, Westphalia	Elsie Wolfenbarger, Winkler
Jessie Perol Stratton, Winfield	Wilma Wanueta Womer, Smith Center
Cleda Genevea Taylor, Manhattan	Ida Yvonne Wynette, Harper
Ruth Georgia Taylor, Tyro	Susan Elizabeth Young, Jewell
Leona Emma Teichgraeber, Lindsborg	

GENERAL SCIENCE

Leland Carpenter Allis, Manhattan	Glen Engle Lee, Glen Elder
Nelson Joseph Anderson, Burchard, Neb.	George Wesley Leeson, Council Grove
Mary Avis Blain, Manhattan	Fred Clarence Lewis, Manhattan
Lucile Bomgardner, Topeka	Robert Donald MacGregor, Topeka
John Milton Boring, Spring Hill	Ressie Olive McMillan, Howe
Arthur Newton Burditt, Ness City	Martha Merle McNamara, Manhattan
Frank Swartz Campbell, Manhattan	Pearl Lily Miltner, Wichita
Evelyn Dulcine Carey, Manhattan	Chester Parker Neiswender, North Topeka
Milo Glen Cary, Manhattan	Lucile Owens Norwood, Manhattan
Imogene Marjorie Chase, Manhattan	Ursula Oldham, Winfield
Charles Frank Church, Wichita	Alice Eugenie Olson, Manhattan
Frank Harold Collins, Wellsville	Ruby Elizabeth Orth, Manhattan
Elizabeth Agnes Cotton, Wamego	Flora Roccena Parker, Ottawa
Nora May Dappen, Ramona	James Edwin Pratt, Glen Elder
Earl Edward Davis, Manhattan	Marion Capps Reed, Manhattan
Floyd Leslie Fletcher, Waldo	Blanche Martha Sappenfield, Clifton
George Albert Foltz, Oswego	Jewell Dan Sappenfield, Clifton
William Edward Forney, Cottonwood Falls	Sadie Louise Smith, Coffeyville
George Edward Fulcomer, Belleville	Vern Washington Stambaugh, Maple Hill
Nattie Helen Goldsmith, Athol	Donnelly Joseph Tarpy, Pawnee Rock
Robert Stanton Hargis, Inman	Hazel Dora Taylor, Winfield
Ethan Allen Herr, Medicine Lodge	John Edward Tillotson, Manhattan
Charles Wilber Howard, Colby	Nellie Pearl Tipton, Wichita
Claude Elton Hutto, Manhattan	William Tully Turnbull, Manhattan
Calvin Lafayette Irwin, Le Roy	Anna Louise Walker, Dalhart, Tex.
Henry John Kliwer, Emporia	Ross Arthur Williams, Manhattan
William Harry Knostman, Wamego	Nettie May Mismar, Pomona
Henry Brownell Lawton, Americus	Jay Lester Woodhouse, Sharon Springs

INDUSTRIAL JOURNALISM

Albert Hamilton Acre, Wakeeney	Ralph Leon Foster, Courtland
Walter Arthur Bergen, Felsburg	William Albro Giles, Manhattan
Donald Waldo Blair, Lyons	Ruth Bernese Henderson, Alma
Bruce Brown Brewer, Manhattan	Adolph Lawrence Jantz, Larned
Velma Lenore Carson, Clifton	Walter August Karlowksi, Sylvan Grove
Sara Chase, Manhattan	Margaret James Schattensburg, Manhattan
Lewis Lines Cobb, Wamego	Romayne June Spurling, Wichita
Sarah Katherine Drake, Manhattan	Nellie Agnes Thornburg, Jetmore
Nadia Dunn, Manhattan	Mark Wentz, Burlington
Henry Clyde Fisher, Lowemont	

FRESHMEN

AGRICULTURE

Delbert Answel Adams, Eureka	Harry Raymond Barnes, Rocky Ford, Colo.
Alan Bryan Adamson, Beloit	Herbert Conna Barrett, Anthony
Boyd Funston Agnew, Yates Center	Charles Sloan Batdorf, Wellsville
William Maynard Agnew, Yates Center	Lloyd James Beardsley, Russell
George Henry Atherton, Maize	Homer Glenn Beatty, Luray
† Walter Glenn Austin, Irving	Ralph Pierre Beckett, Greensburg
Kay Allen Axtell, Dimmitt, Tex.	Frank Graft Bell, San Antonio, Tex.
John Henry Ayers, Gooding, Idaho	Earl H. Bingham, Morris, Ill.
Kenneth MacKenzie Baird, Edgerton	Nelson Boyle, Spivey
Thurman Bryan Barker, Bethel	Henry Howard Braum, Denison

† Short course, winter term.

FRESHMEN—continued

- Orval Sheridan Brower, Sedgwick
 Arthur Browne, Burdett
 Clancy Roy Brown, Burrton
 Joseph Oscar Brown, Sanford, Fla.
 Martin Daniel Bruner, Concordia
 Walter Buess, Kinsley
 George Washington Bursch, Buffalo
 Francis Cecil Caldwell, Manhattan
 Loys Harold Caldwell, Harlan
 Bryan Lee Cauty, Buffalo
 Samuel David Capper, Ames
 ‡ Frank Alvin Carlson, Garfield
 Harold Scott Carothers, Peabody
 Robert Ray Carothers, Peabody
 Roscoe Jofa Carson, Liberal
 Glen Marvin Case, Alta Vista
 DeLoss Chapin, Manhattan
 Usted Lee Clair, Codell
 Embert Harvey Coles, Seneca
 Howard Loyd Comfort, Cawker
 ‡ Hall Isaac Cope, Norton
 George William Corbet, Leona
 Chester Joseph Cosand, Belleville
 DeWitt Craft, Kinsley
 Verne Lloyd Culver, Wichita
 Frank Lester Dale, Manhattan
 David Everett Davis, Topeka
 Glenn Wallace Davis, Manhattan
 Russel Gordon Davis, Bronson
 Carl Emerson Depue, Parker
 Laurence Morris Dike, Overland Park
 Emmett Francis Donley, Oxford
 Linn Edmund Eberwein, Lawrence
 Donald William Elbert, Ness City
 Clarence Jinks Etherington, Manhattan
 Ray Ferree, Yates Center
 Howard Daniel Finch, Whitewater
 Kenney Lee Ford, Seneca
 Clarence Edwin Freeto, Wichita
 Truman Olvord Garinger, Admire
 Harold David Garver, Abilene
 Charles Louis Giles, Santa Fe
 Norman Albro Giles, Hutchinson
 Charles Lincoln Gilruth, Winfield
 George Albert Gingrich, Wakefield
 ‡ Charles W. Gregory, Devizes
 Ward Clarke Griffing, Manhattan
 Evan Lawrence Griffith, Manhattan
 Roy Evan Griffiths, Riley
 Harold Reed Guilbert, Wallace
 Claude B. Harris, Havensville
 ‡ Willis Wilson Haseltine, Cawker City
 George M. Hedges, Howard
 George Granville Hedrick, Gardner
 John Phillip Hellwig, Oswego
 Ross Lincoln Hicks, Norton
 Philip James Hill, Manhattan
 George Winfred Hinds, Manhattan
 Archie Julius Hinzy, Kiowa
 Glenn Oscar Hoffhines, Marquette
 Walter Rawlins Horlacher, Colby
 Dana Howard, Hiawatha
 Edgar Otis Hull, Eureka
 Felix Heath Hull, Eureka
 Fred Harold Hull, Portis
 Lowell Johnson, Olathe
 Carlos McKinley Johnston, Attica
 John Lemley Macklin, Burns
 Glenn Jones, Chanute
 John Victor Keene, Ottawa
 Frank Sylvester Kinsey, Troy
 ‡ Bruce John Kyle, Cawker City
 Dewar Perry Kyle, Cawker City
 Ernest Lester Lahr, Abilene
 Wilber F. Lane, Jamestown
 Robert Edgar Lee, Louisburg
 Ray Losh, Leon
 Grace Adella Low, Stockton
 Frank Rial Loyd, Gretna
 Eugene Sidney Lyons, Lawrence
 Rollo Wade McCall, Brewster
 James Monroe McCay, Coldwater
 Dewey Zollie McCormick, Zeandale
 Ross Franklin McKee, Blue Rapids
 Scott McKown, Sherman, Tex.
 William Luther Martin, Winfield
 Ezra Perle Mauk, Manhattan
 Rex Arthur Maupin, St. Joseph, Mo.
 Calvin Medlin, Manhattan
 Edward Raymond Menefee, Manhattan
 James Herbert Moyer, Hiawatha
 Joseph Linn Mullen, Clay Center
 Philip Earl Neale, Manhattan
 Walter Ruben Nelson, Clifton
 Raymond Clyde Nichols, Buffalo
 Donald Lawrence Nonken, Burns
 Reeves Ayers Osborne, Burrton
 Elroy Spencer Parnell, Lawrence
 Arthur Bernard Penner, Potwin
 Carroll Davidson Phillips, Del Norte, Colo.
 Harry Benjamin Pope, Waverly
 Martin S. Pressgrove, Tecumseh
 Perry Leland Putnam, Admire
 Arthur Cecil Ramsey, Osage City
 Henry Irving Richards, Howard
 Louis Rudolph Ritter, Jonesboro, Ark.
 William Ellet Robison, Towanda
 Walter William Rodewald, Vassar
 Enoch Warren Roney, Harper
 Luella Mabel Clara Schaumberg, La Crosse
 George William Schmidt, Junction City
 F. Smith Schneider, Manhattan
 George Russell Schroll, Syracuse
 Robert Ewing Sears, Eureka
 Palmer Willard Selfridge, St. John
 Omer John Shields, Lost Springs
 Joseph Virgil Shull, Holisington
 Owen Glee Skinner, Marion
 Harry Edwin Skoog, Corbin
 Cecil Franklin Smith, Randall
 Herbert Ralph Smith, Kinsley
 Marion Ashton Smith, Topeka
 ‡ Neal Smith, Arcadia
 James Campbell Snapp, Manhattan
 Fletcher Speck, Kansas City
 Harm Louis Splitter, Lorraine
 Marion Bush Steinmetz, Alden
 John Chalmers Stephenson, Cawker City
 Warren Roy Stewart, Manhattan
 Joseph Perry Stinson, Jamestown
 J. Harold Sturgeon, Eureka
 Charles Swingle, Manhattan
 Glenn F. Taylor, Onaga
 Russell Lowell Taylor, Iola
 Leslie Case Teed, Weskan
 Samuel Isaac Thackrey, Manhattan
 Donald Cheney Thayer, Manhattan
 Kyle David Thompson, Densmore
 Charles Albert Thresher, Jetmore
 Martin Carl Tiemeier, Lincolnville
 James Alonson Titus, Harper
 Earl Richard Tobler, Eskridge
 William Ira Turner, Milton
 Norman Valley, Manhattan
 Harry McKinley Vance, Marion
 Walter Henry von Treba, Oswego
 John Luther Armon Wainscott, Hazelton
 Leow Huston Wallace, Winfield
 Albert Neal Waters, Blue Rapids
 Merrill Worthing Watt, Topeka
 Ralph Marion Weaver, Bazine
 Claude Arnold Weir, Stafford
 Claude Allen White, Lockney

‡ Short course, winter term.

FRESHMEN—continued

James Marshall Whittington, Alma, Ark.	Homer Carlton Wood, Manhattan
Fred Bixler Widmoyer, Minneapolis	Joel Earl Wood, Manhattan
Rex Arthur Wilbur, Oberlin	Warren Mudgette Woodman, Vermilion
Herbert Lawrence Wilkins, Los Angeles, Cal.	Lawrence Earl Woods, Newton
John Henry Wilkinson, Mound City	Clark Works, Humboldt
Charles Owen Williamson, Manhattan	Milton Wyatt, Kansas City
Paul Roscoe Willis, Horton	Chauncey DeWitt Yeoman, Hutchinson
George Wallace Wilson, Oberlin	John Williamson Ziegler, jr., Lansdowne, Pa.

VETERINARY MEDICINE

James Frederick Adee, Manhattan	Samuel McCullough, Solomon
Ralph Vernon Baker, Manhattan	Isaac Tennyson Mock, Idana
Louis Bloyce Bate, Wichita	Thomas Gilbert Perry, Wichita
Elmo Murray Berroth, Arkansas City	Lester Ray Poole, Holton
Charles Lester Bonnett, Winfield	Winfield John Ritter, Parsons
Isaac Frank Gates, McPherson	Merrill Philip Schlaegel, Vermilion
Simon Harrington, Manhattan	Lee Ashton Scott, Westphalia
Ernest Hartman, Raymond	Grover Meeker Simpson, Salina
Ralph Ward Hixson, Hiawatha	Adrian Harold Skinner, Fairview
T. Foree Hobbie, Dodge City	Jay Erskine Stanton, Manhattan
Stuart Laverne Hunt, Blue Rapids	Brainard Louis Taylor, Arkansas City
William Kaine, Wamego	Roy James Tucker, Kansas City
Frank Horace Kellogg, Wellington	Wayne Henry Vanatta, Cripple Creek, Colo.
Larkin Crawford Keown, Pond Creek, Okla.	Loren Gilbert Van Zile, Manhattan
Aubrey Mac Lee, Manhattan	Roy Thomas Vezie, La Cygne
	Brenner Bagnall White, Delphos

ENGINEERING

Jesse Ray Amick, Cunningham	Lester Frank Gfeller, Junction City
Francis Frank Anderson, Wichita	George Edward Goodwin, Alma
Ernest Ezra Andrus, Severance	John Francis Grady, Lansing
Ernest Earl Asher, Great Bend	Charlie Floyd Graves, Clifton
Harold Winthrop Batchelor, Manhattan	Percy Frank Griffing, Nickerson
Clyde E. Beckett, El Dorado	Harry Anton Gumness, Junction City
Dean Robert Billings, Maple Hill	Carroll Carson Halbower, Anthony
James Russell Bily, Benton	Emmor Weir Hall, Oakley
Raymond Walstein Binford, El Dorado	Fred Lynn Hall, Almena
Paul Thomas Blakey, Cheney	Herbert Eugenie Hall, Belle Plaine
†Ulysses S. Grant Bowen, St. John	Lawrence Hammond, Smith Center
Lawrence William Bright, Wichita	Ernest Fay Hendrickson, Manhattan
Guy Mahlon Brown, Manhattan	Grant William Herzog, Fort Riley
Lawrence E. Brown, Syracuse	Harold Charles Hewson, Larned
Clarence Leland Browning, Manhattan	Roscoe Easter Hey, Manhattan
Walter Bryan Carey, Hutchinson	Russell Dean Hilliard, Westmoreland
Leo Carlson, Almena	Fred William Hiss, Great Bend
Robert Orville Carson, Winchester	Frank Hoath, Anthony
Iber Champ, Oatville	Herman George Hockman, Beattie
Harold Julius Chapman, Speed	Bruce Charles Hutchins, Ellsworth
James Childers, Wamego	Fred Irwin, Manhattan
William George Clary, Oakley	Edward Henry Jilko, Ellsworth
Archie Randall Cless, Rossville	Oria John Johnson, Olathe
Nathan Coleman, Powhattan	Stephen Kaufman, Oakley
Reuben Lee Cooper, Columbus	Dwight Moody Keas, Princeton
George William Corzine, Wichita	Otis Bert Kirk, Manhattan
John Ericcile Dana, Hutchinson	Clifford Kniseley, El Dorado
Guy Ellis Davis, Altamont	Ralph Watson Kratz, Michigan Valley
William Handley Dean, Edgerton	James Merritt Lane, Neosho Falls
Addison Curtis Depuy, Manhattan	Forrest Lowell Langdon, Kansas City
Fred Joseph Dietrich, Carbondale	Edgar Rankin Lawton, Larned
Victor F. Dolecek, Ellsworth	John William Lemon, Pittsburg
Merton Edward Dull, Westphalia	Archie Leonard Light, Winfield
H. Myers Duphorne, Sharon Springs	James Wesley Lucas, Bayneville
Roy Frederick Eckart, Paola	Merle James Lucas, Pratt
Charles Verne Ewan, Oakley	Samuel Patterson Lyle, Manhattan
Malcolm Robert Fergus, Garnett	Lowell Hobart McDonald, Concordia
Paul Lowell Fetzer, Manhattan	William Arthur McGinley, Colby
Hubert George Ficken, Bison	Francis Dewey Maldoon, Marysville
William Robert Folck, Little River	†Earle Runkle Manners, Lucas
Asa Herbert Ford, Seneca	Victor Mead, Wichita
Harvey Dwight Franklin, Horton	Carl Franklin Mershon, Oakley
Carl Amerson Freed, Moline	Lloyd Rayburn Miller, Belleville
Ferd Mallory Frogge, Oakley	George Harold Molesworth, Louisburg
Ralph Fulton, El Dorado	Floyd Ellison Moore, Manhattan
William Delmont Fulton, Pratt	Charles Francis Morris, Wichita
Oscar Deane Gardner, Louisburg	

† Short course, winter term.

FRESHMEN—continued

Frank Banner Mueldeker, Lyons	June Smith, jr., Cottonwood Falls
George Miles Munsell, Leon	Raymond Woodruff Smith, Hiawatha
Arthur Edward Nelson, Lindsborg	William Elton Smith, Stockton
Ralph Griffith Nevins, Dodge City	Cantrell Watkins Snodgrass, Salina
Dewey Newcombe, Great Bend	Joe Raymond Speer, Muscotah
Frank Edward Nordeen, Dwight	Ellis Odel Stackfleth, Anthony
Guy Oden, Sterling	Everett Stearns, Towanda
Charles O'Leary, Manzanola, Colo.	Paul Max Stephenson, Gaylord
Everett Manahan Oxley, Manhattan	Wesley Stevens, Great Bend
James Ora Parr, Rossville	Lawrence Edward Stonge, Riley
John Raymond Parrott, Shaw	Rudolf Edward Trachler, Burlington
Amos Oliver Payne, Manhattan	William Wesley Trego, Sedgwick
Floyd Owen Payne, Erie	Victor Charley Tucker, Courtland
Chester P. Persons, Manhattan	Raymond Edwin Vermette, Atchison
†Karl Niel Pfeutze, Randolph	Carl Edwin Webb, Oxford
Herman D. Pfeutze, Randolph	Wilbur Reece Whitacre, Winfield
William Dale Pierce, Concordia	John Doane Whitecomb, Cottonwood Falls
John Kent Pike, Chanute	Clifford V. White, Bucklin
Ralph Brook Porter, Blue Mound	Floyd Terry Whitlow, Moran
Arthur William Quinlan, Lyons	Laurence William Wiest, Manhattan
Walter Hosea Reed, Whiting	Paul V. Willard, Manhattan
William Andrew Riordan, Solomon	James K. Williams, Marion
Warren Earl Rothweiler, Bison	Arlie E. Wilson, Parkerville
Fred Rumford, Houston	Lawrence Harold Wilson, Alida
Frank Louis Sahlmann, Lincoln	John Kirk Wood, Overland
McSellan Sallee, Marion	Floyd Wayne Work, Windom
George Porter Sanford, Kansas City	Floyd Hoag Wright, Carmen, Okla.
Glen Ransom Sawyer, Moline	Irving Wulfekuhler, Leavenworth
Lee Thomas Scott, Westphalia	Charles Zimmerman, Manhattan
William Dennis Scully, Belvue	Lloyd Zimmerman, Lockney, Tex.
James Jacob Seright, Lucas	

HOME ECONOMICS

Kathryn Ruth Adams, Manhattan	Ruby Louise Crocker, Matfield Green
Mabel Christmas Adams, Garden City	May Dahnke, Manhattan
Vivien Golden Alford, Council Grove	Verla Lucille Dahnke, Manhattan
Mildred Jeanette Arends,	†Helen Dale, Protection
Kansas City, Kan.	Bertha Lewis Danheim, Blue Rapids
Opha Zetta Babb, Douglass	Verna Belle Davidson, Glasco
Grace Eleza Baker, Baldwin	Doris Crane Davis, Topeka
Nellie Mary Ellen Baker, Baldwin	Helen Josephine Dawley, Waldo
Edna Marie Bare, Protection	Sarah May Dewey, Manhattan
Helen Cecile Beck, Topeka	David Chandler Dow, Salina
Delma Lenore Bergsten, Randolph	Vinnie Drake, Manhattan
Hazel Beverly, Manhattan	Gertrude Alice Dubach, Wathena
Ernestine Biby, Topeka	Alma Edyth Dusenberry, Mankato
Bertha Johanna Biltz, Lindell	Hazel Viola Dyer, Oberlin
Anna Maude Blackwell, Manhattan	Mildred Easley, Manhattan
Pauline Edith Blakey, Cheney	Jennie Belle Eibest, Lawrence
Mary Grace Boone, Lansing	Dorothy Louise Elder, Winfield
Viola Margaret Brainerd, Paola	Margaret Jeanette Elliott, Belleville
Marian Bretch, Hobart, Okla.	Margaret Salina Etzold, Liberal
Elsa Ann Brown, Manhattan	Mabel Lena Evans, Liberal
Marjorie Moonlight Brown,	Fanny Fern Fergus, Mildred
Kansas City, Mo.	Nanette Lillian Ferguson, Olathe
Irene Mary Buckles, Olsburg	Anna Helen Ficke, Canadian, Tex.
Elizabeth Burgner, Burlington	Ina Ruth Findley, Manhattan
Ella Burke, Cassoday	Agnes Eloise Flanders, Westboro
Gladys Elizabeth Burris, Chanute	Garnette Frank, Manhattan
Esther Eleanor Burt, Eureka	Katharine Friesen, Hillsboro
Phoebe Buzard, St. Joseph, Mo.	Mary Abigail Furneaux, Moran
Hettie Carris, Topeka	Gladys Lorena Ganshird, Manhattan
Maude Ellen Carter, Tonganoxie	Ruth Emma Gardenhire, Alma
Lois Helen Case, Alta Vista	Ethel Victoria Garrett, Manhattan
Ethel Hope Chitty, Alta Vista	Vera Margaret Garvin, Lawrence
Corinne Catherine Clement, Pierce City,	Edna Marion George, Liberal
Mo.	Mary Helen Gilbert, Manhattan
Esther Annetta Colvin, Topeka	Mary Elizabeth Gilliam, Moline
Marjorie Cook, Medicine Lodge	Sara Gilmore, Dodge City
Edith Virginia Corbet, Leona	Rachel Glasscock, Kansas City
Nora Corbet, Leona	Ilah Grace Gortner, Mount Hope
Doris Mildred Crandall, Manhattan	Maude Elizabeth Grant, Wallace
Anna Marie Elizabeth Crocker,	Gladys Mae Green, Jewell City
Matfield Green	

† Short course, winter term.

† Housekeepers' course, fall and winter terms.

FRESHMEN—continued

Hannah Elizabeth Greenlee, Kansas City, Kan.	Cecile Cynthia Persinger, Clinton
Dora Eva Grogger, Manhattan	Ethelyn Lucina Preston, Blue Rapids
Mary Elizabeth Hagenbuch, Troy	Alice Virginia Pyle, Hamlin
Margaret Mae Hale, Lebanon	Grace Elizabeth Ratliff, Ogden
Mary Winifred Hamilton, Manhattan	Phoebe Frances Rebstock, Newton
Marie Hammerly, Manhattan	Clara Belle Reynolds, Mulvane
Dorothy Lucia Hammond, Manhattan	Ada LaVerne Robertson, Washington
Agnes Handlin, Manhattan	Anna Marie Roenick, Morganville
Camilla Hanson, Concordia	Amanda Christina Rosenquist, Osage City
Lucile Evelyn Harbaugh, Kansas City, Mo.	Clara Eva Schmidt, Lorraine
Ruth Anna Harding, Fort Scott	Eliza Lucretia Scholer, Milo
Margaret Elizabeth Hart, Topeka	Letha Alice Sculley, Colony
Bessie Amaryllis Hegle, Lost Springs	Ione Evangeline Seleen, Marquette
†Helen Lucile Heiser, Tonganoxie	Florence Margaret Seimon, Hutchinson
Dorothy Elizabeth Hildenbrand, Leecompton	Neva Lucille Sharum, Merriam
†Cecil Hill, Basehor	Mamie Frances Sherrod, Goodland
Mary Jane Hill, Burlington	Marjory Hannah Simpson, Nowata, Okla.
Alma Dorothy Hoffman, Enterprise	Faye Margaret Sipes, Great Bend
Rachel Lenore Horton, Arkansas City	Fern Viola Skaer, Augusta
Mary Leone Horttor, Blue Mound	Bessie Magdaleon Sloan, Salina
Ruth Vivian Houghton, Kackley	Beulah Frances Smith, Osborne
Zada Amelia Houston, Potwin	Grace Marie Smith, Hoyt
Clara Belle Howard, Colby	Grace King Smith, Le Roy
Hazel Dell Howe, Garrison	Ethelyn Gertrude Staadt, Ottawa
Maisie Agatha Hoyt, Arkansas City	Prudence Stanley, Topeka
Esther Florence Hucksoll, Abilene	Velda Elizabeth Stewart, Morganville
Merrie Mari Hudson, Williamsburg	Ella Belle Stinson, Kansas City
Kate Hutchings, Kansas City	Vida Elizabeth St. John, Rocky Ford, Colo.
Jane Jenkins, Boulder, Colo.	Marguerite Marie Stotts, Diller, Neb.
Helen Myrtle Johnson, Wichita	Josephine Sullivan, Wamego
Huldah Dorothy Johnson, Marquette	Martha Sarah Summers, Beloit
Anna Esther Jones, Manhattan	Abbie Swafford, Manhattan
Florence Esther Joss, Topeka	Laura Bell Taylor, Onaga
Frances Winifred Kennedy, Lawrence	Florine Elzie Teichgraber, Emporia
Trixe Una Knight, Jamestown	Wanda Tetrick, Eureka
Letha Sarah Lasswell, Rossville	Helen Anna Thomas, Medicine Lodge
Nyle Eloise Lewallen, Manhattan	Dessie Olive Thornburgh, Manhattan
Georgia Dorothy Lilley, Burns	Beulah Elizabeth Tittle, Goodland
†Bernice Logan, Kansas City, Mo.	Charlotte Irene Toliver, Abilene
Anne Marie Lorimer, Olathe	Laura Elizabeth Toy, Cherryvale
Frances Evelyn Lovett, Eureka	Margaret Leon Trager, Bucklin
Bessie Lenore Lyman, Manhattan	Marie Caroline Travis, Wichita
Grace Loomis Lyness, Walnut	Louise Clark Unthank, Kansas City
Hazel Alma Lyness, Walnut	Ethel Grace Van Gilder, Manhattan
Gertrude Elizabeth McElroy, Manhattan	Winifred Blanche Van Gilder, Manhattan
Anna Leah McIntyre, Topeka	Ella Haines Vanneman, Kansas City
Gladys Marie Martin, Holton	Ethel Varner, Augusta
Estella Barbara Meisner, Sabetha	Adah Mary Vawter, Arkansas City
Josephine Alta Meldrum, Cedar Vale	Gladys Annette Vincent, Overbrook
Lucille Mary Messerley, Osage City	Edith Grace Wakefield, Culver
Rhoda Meyer, Garnett	Loverne Webb, Cedarvale
Adda Middleton, Minneapolis	Martha Lucile Webb, Cedarvale
Florence Irene Mirick, Otis	Helen Marie Weir, Winfield
Deana Mitchell, Mound City	Jeanetta May Wheeler, Garden City
Marian Estelle Mitchell, Tecumseh	Elizabeth Whetstone, Pomona
Clara Belle Moore, Holton	Frances Josephine Whitmire, West Plains, Mo.
Marguerite Moorman, Nickerson	Alma Luella Wilkin, Aulne
Eloise Morrison, Topeka	Edna May Wilkin, Aulne
Louise Morse, Burns	LaFaun Ruth Wilkins, Liberal
Glenna Fay Morse, La Crosse	Faye Williams, Gardner
Irene Mae Mott, Herington	Anna Alberta Wilson, Wichita
Hazel Ione Murphy, Manhattan	Minnie Wilson, Manhattan
Helen Isabel Neiman, Whitewater	Carol Wiltrout, Logan
Bethel Melus Nelson, St. Joseph, Mo.	Gladys Thelma Woodward, Kansas City, Mo.
Pera Aral Nemnich, Clay Center	Madge Woodworth, Olathe
Fannie Gladys Nichols, Manhattan	Leona May Wynette, Harper
Edlena O'Neil, Quindaro	Fay Aileen Young, Le Roy
Laura Gertrude Palmer, Phillipsburg	Florence Edna Younkin, Nickerson
Myrta Louise Parker, Rosedale	
Ida Pearl Parkhurst, Kinsley	
Ruby Lauretta Parkhurst, Kinsley	
Elsie Mae Peckenpaugh, Seneca	

GENERAL SCIENCE

Ida Gertrude Adee, Manhattan	Mary Margaret Atteberry, Manhattan
Paul Judson Allen, Seneca	Mary Inez Backman, Manhattan
John Wendell Andrews, Manhattan	Marie Frances Baird, Cassoday
Willard Armstrong, Larned	Vernon Eugene Barber, Glen Elder

† Housekeepers' course, fall and winter terms.

FRESHMEN—continued

Thomas Baumgartner, Manhattan	Elithe Eleota Kaull, Glen Elder
Ralph Orton Bell, Wellsville	Cashel Sardis Kelly, Topeka
John Lawrence Campbell, Manhattan	Gertye Mabel Kobes, Manhattan
Iva Rose Bishop, Haven	Ralph Cole Lapsley, Burlington
Walter McKinley Blackledge, Onaga	Ava Patricia Lockwood, St. Francis
Daniel Blanchard, Manhattan	Chester Alfred Lockwood, Mound City
Otto Theodore Blanke, Garden City	Herbert William McClelland, Manhattan
Nora Margaret Boettcher, Winkler	George Washington McVey, Hill City
Palmer Fair Bressler, Manhattan	Sylvester Samuel Marshall, Manhattan
Oliver Wendel Broberg, Manhattan	Earl Moore, Muncie
Byron Bushong, Everest	Herbert Wayne Moore, Geneseo
James Blaine Christner, Manhattan	Paul Arthur Noce, Neodesha
Elizabeth Duncan Circle, Kiowa	Nellie Maria Payne, Manhattan
Wallace Clapp, Logan	Eugenia Langson Plumb, Pleasanton
Ercile LaVeta Clark, Hutchinson	Tilmon Leeroy Roberts, St. John
Beulah Belle Coffelt, Blue Mound	Walter John Rogers, Salina
Fannie Louise Cutshaw, Jamestown	Irvin Thomas Rothrock, Johnson, Ark.
Hobart McKinley Danielson, Clyde	Lenora Olive Rude, Manhattan
Mary Frances Davis, Bronson	Addie Ruth Sandman, Harbine, Neb.
Laura Viola Denman, Manhattan	Joseph Newton Sawtell, Kansas City
Rowland Leeds Dennen, Seneca	Kuby Saddler Scott, Kansas City
Mary Edna Dunham, Sulphur Springs, Ark.	Charles Edgar Shaw, Louisville
Maggie Ellis, Westmoreland	Edgar Henry Siemers, Wakefield
Mary White French, Jamestown	Floyd Hamilton Stout, Hill City
†Clyde Dow Frost, Blue Rapids	May Sturgeon, Eureka
Earle Wesley Frost, Blue Rapids	Percy Swain, Soldier
Paul John Fulcomer, Belleville	Merton Henry Swanson, Manhattan
Grace Iola Gish, Manhattan	Charles Manley Tinkler, Gypsum
Oliver Wendell Harper, Kansas City	Edwin Todd Wheatley, Horton
Virgil Vallorous Harris, Burr Oak	Roy William Whitmore, Potwin
Emra Adam Hepler, Manhattan	Bertha Eunice Whitton, Kiowa
Amma Cammella Herren, Manhattan	Emma Whitton, Kiowa
Oralea Hinson, Stockdale	Andrew Wilber Wilcox, Manhattan
Lelia Mary Hughes, Kansas City, Mo.	Harold McLeland Winslow, Kansas City
Ruth Mary Jacobson, Formoso	Harold Stephen Woodard, Glen Elder
Roscoe Conklin Johnson, Oswego	Lydia Lucile Yost, Munden
Mabel Jones, Garnett	Lulu May Zeller, Manhattan

INDUSTRIAL JOURNALISM

Martha Sareta Borthwick, Ness City	Josie Long, Manhattan
Zattie Othellia Carp, Wichita	Frank McGrath, Gardner
Dora Lydia Cate, Manhattan	Carl Patterson Miller, Belleville
Esther Charles, Republic	Gertrude Erma Norman, Manhattan
Theodore Henry Enns, jr., Inman	Eli Paul Pinet, Onaga
Ebert Morton Hartwell, Holliday	Charlotte Frances Russell, Winfield
Leo Horne, Alma	Laura Edna Shingledecker, Manhattan
Mary Agnes Hutto, Manhattan	Emma Kate Smith, Westphalia
Leslie Everett Jacobson, Formoso	Lottie Thompson, Wichita
Kathryn Estelyn Kayser, Bronson	Margaret Woodman, Manhattan

School of Agriculture

THIRD YEAR

Phebe Antoinette Allen, Richfield	John Michael Quinn, Salina
Bertha May Altus, Garden City	Karl Spangler Quisenberry, Newton
Elmer George Becker, Meriden	Henry Edward Rahe, Winkler
†Walter Oscar Bowell, Kensington	Edith Eugene Riley, Reece
Ruth Hazel Branch, Manhattan	Fred John Robb, Scott City
Marie Long, Manhattan	Mary Elsie Rose, Paola
Ray Edward McMoran, Aetna	Clara Schober, Baker
Harry Asa Muir, Salina	

SECOND YEAR

Anne Susie Amstutz, Halstead	David Edgar, Beaumont
John William Bierer, Wichita	Elmer Ernest Fesenbek, Seneca
Harry Newkirk Bradley, Garnett	Earley Orlando Forristall, El Dorado
John Thomas Brownrigg, Mont Ida	Ygnaxio Vanquez Gomez, San Antonio, Tex.
Margaret Elizabeth Chapman, Manhattan	Burford Bean Hartman, McCune
John Warren Conrow, Manhattan	†Merlin Wilson Hawk, Salina
John Dakin, Ashland	Ira Mearle Hepler, Manhattan
Jedediah Silas Dewey, Manhattan	Harold William Johnson, Cleburne

† Short course, winter term.

SCHOOL OF AGRICULTURE—SECOND YEAR—continued

Scott Elijah Kelsey, Topeka
 Emma Christina Larson, May Day
 Charlie Clayton Lawrence, Chanute
 Ethel Lenora Manwarren, Geneseo
 Cordelia Estella Masterson, Manhattan
 John Henry Meek, Idana
 Orrie Linsey Norton, La Cygne
 Raymond William Oehrle, Lawrence
 Harry Eugene Pierce, Darlow
 Irene Pieratt, Hartford
 Paul Norman Pieratt, Hartford
 Henry Patrick Quinn, Manhattan
 Randall Reid, Collyer

Katie Mable Roberts, Manhattan
 Charles William Rossdeutcher, Topeka
 Herbert Edward Senn, Lasita
 James Frank Smid, Fowler
 Joseph Earl Smid, Fowler
 Ralph Roasa Snyder, Manhattan
 Dean Ralph Stanley, Manhattan
 Frank Arvid Swanson, Manhattan
 Ben Abraham Thompson, Densmore
 Reuben Velen, Cleburne
 Eugene Haley Walker, Manhattan
 Loy Duvall Watts, Fort Scott
 Ruth Rena Wolfenbarger, Winkler

FIRST YEAR

John Quincy Adams, Garden City
 Ralph Waldo Anderson, Manhattan
 Glenn Alexander Art, Westphalia
 Mary Ethel Barker, Bethel
 Gladys Llevetta Barrett, Manhattan
 Reuel Vernon Barrington, Sedan
 Ernest Bernard Bennie, Morrowville
 Thomas Glen Betts, Detroit
 Robert Blanks, Manhattan
 Myra Lorena Blue, Detroit
 Emma Marguerite Bobek, Caldwell
 Roy Vernon Bolz, Hesston
 †Ralph Alexander Bradley, Garnett
 Christiana Lovina Brewbaker, Manhattan
 Nelson Rudolph Brooks, Winfield
 Mildred Frances Brown, Manhattan
 Isaac Ethelbert Brownrigg, Mont Ida
 †Will Thomas Caldwell, Centerville
 Helen Edith Case, Collyer
 Howard Casford, Bird City
 Frank James Chandler, Lawsonheim, Pa.
 Carl Childress, Galena
 Hugh Colhouser, Highland
 Anna Augusta Connor, Collyer
 Ida Augusta Conrow, Manhattan
 William Amy Conrow, Manhattan
 Bernard Conroy, Manhattan
 Elsie Myrtle Corwin, Manhattan
 John Harold Cowen, Fort Scott
 Rose Violet Cox, Delia
 Harold Lee Crawford, Paola
 Harvey Dewey Dam, Marysville
 Daisy Delilah de Haven, Iola
 Wilford Able Dennis, Wichita
 Donald Earl Dickinson, Eureka
 Leon Young Dixon, Holton
 LeRoy Alexander Edgar, Beaumont
 †Pender Estes, Sampsonston, Canada
 Roy Ewen, Earlton
 Mary Anne Fankhauser, Madison
 Minnie Metta Fankhauser, Madison
 Zella May Fankhauser, Madison
 Fred Fetrow, Attica
 Horace Berdwell Fetrow, Cedar
 Verlan Curtis Findley, Penokee
 Harold Orly Ford, Smith Center
 Robert Miles Forrester, Manhattan
 Agnes Elvera Freeman, Scandia
 Clarence Raymond George, Manhattan
 Emilio Vazquez Gomez, San Antonio, Tex.
 Clifford Allen Groendycke, Medicine Lodge
 Ruby Obeira Gunselman, Wakefield
 Harold Halpin, Wichita
 Albert Jost Hammerly, Manhattan
 Lester Lyman Harmon, White City
 Edwin Hedstrom, Dinas
 Ray Hegarty, Lowemont
 Christie Cynthia Hepler, Manhattan
 Albert Jacob Hildenbrand, Lecompton
 Carroll Denne Hodgson, Hutchinson
 Raymond Albright Hoffsommer, Lecompton
 Stella Horchem, Ransom
 †Albert Wright Houghton, Emporia
 Carl Lessley Howell, Thayer
 Florence Hunter, Manhattan

Leslie Charley Kees, Amy
 Rush Kelly, Harris
 Laurence Kitchen, Burlingame
 †Henry Herbert Klusman, Seneca
 Levi Frank Krutz, Hiawatha
 Ellen Marie Lundberg, Courtland
 Selma Amanda Lundberg, Courtland
 Evelyn Vera McDonald, Holton
 Agnes McElroy, Manhattan
 Verne William McKinley, Admire
 Mitchell McRoberts, Muskogee, Okla.
 Joseph Arthur Martin, Manhattan
 †Homer Vincil Moore, Mont Ida
 Lee Dewey Mortimer, Manhattan
 Burke Murry, Chilhowee, Mo.
 George William Nordeen, Dwight
 Alvin Morris Olson, Glasco
 George Olin Oveson, Osage
 Mary Jane Palmer, Abilene
 Esther Peterson, Dwight
 Robert Allen Potter, Hiawatha
 Margaret Agnes Quinn, Manhattan
 Gordon Redman, Great Bend
 Fred Roark, Lake City
 Beulah Mabel Roberts, White City
 Vance Mather Rucker, Burdett
 †Nels Ephraim Samuelson, Axtell
 William Whatt Sanders, Leavenworth
 Marie Schaal, Manhattan
 Thurman Allen Schooler, Hiawatha
 Mary Schwab, Madison
 Workman Archer Scott, Jennings
 Mary Almeda Shaner, Riley
 Gladys Maxene Smith, Deer Creek, Okla.
 Grace Margie Smith, Manhattan
 John Raymond Smithheiser, Danville
 Eddie Vincil Spaht, Elk City
 Floyd Edward Spencer, Mound Valley
 Ralph Clarence Stahl, Manhattan
 Flossye Lota Stapleton, Manhattan
 Bruce Smith, Manhattan
 Alexander George Stratmann, Holyrood
 Homer Lewis Sumners, Riley
 Harold Ray Sutton, Emporia
 †Oliver Sewell Tarr, Manhattan
 Gertrude May Taylor, Junction City
 Mildred Taylor, St. Edward, Neb.
 Lothare Willard Thatcher, Topeka
 Warren Perry Thayer, Manhattan
 James Earl Thomas, Munden
 John Walton Unger, Jr., Lecompton
 Theodore Edward Urton, Eminence
 Marion Velthoen, Manhattan
 †Wilson Wade, Howard
 Francis Lindley Watson, Peck
 Stacy Everett Watson, Peck
 Roy Berle Wells, Burlingame
 Lillian Henrietta Wiegand, Inman
 Louis Bryan Wilcox, Sylvan Grove
 Harvey Alonzo Williams, Sylvan Grove
 Everett Gareth Wilson, Strong City
 William Clyde Wilson, Kansas City
 †Raymond Evens Young, Wallace

† Short course, winter term.

SCHOOL OF AGRICULTURE—SPECIALS

John Akers, Conway	†Leon Lincoln Gray, Wabaunsee
Marion Adaline Allen, Richfield	Willis Goodrich Griffing, Manhattan
Malcolm Llewellyn Alsop, Wakefield	William Bradford Grimes, Ashland
Henry Cribbs Altman, Amy	Bertha May Gwin, Morrowville
Charley Amann, Solomon	Joseph Robert Hall, Kansas City
Clarence Amann, Solomon	Lawrence Hall, Manhattan
Bernard Austin, Manhattan	Floyd Joe Hanna, Manhattan
William Baird, Cassoday	John Tonie Hansen, Willis
Leland Isaac Baker, Baldwin	Gertrude Elizabeth Harling, Manhattan
Herbert Bales, Manhattan	Mary Editha Harmon, White City
Emmet Lawrence Barkyoum, Bala	Loyal Gouin Harris, Manhattan
Burton Bernard Bayles, Manhattan	Jane Gladys Hartley, Manhattan
Merl Eldon Beard, Wichita	Frieda Louise Haslam, Manhattan
Ellen Emelia Bengtson, Olsburg	August Leonard Heisel, Scranton
Mabel Rose Bentley, Valhalla	William Chester Heynen, Manhattan
James Earl Beverly, Manhattan	Ethel Bebe Hibner, Gardner
Alva Jonathan Bogue, Manhattan	Laura Etta Hicks, Smith Center
Henry Benton Bondurant, Bazine	Ross Wayne Hill, Manhattan
Sibyl Winnifred Bondurant, Bazine	Myra Gladys Hiner, Manhattan
Carl William Bower, Manhattan	Clarence David Hodge, Parsons
David Francis Bradley, Hutchinson	Lily Rose Hoffsommer, Leocompton
Marie Elizabeth Brannick, Manhattan	Elmer Hopp, Manhattan
Bessie Lyla Brigham, Burlington	Edmund Hubert Hovey, Cambridge
Birdella Mae Brubaker, Manhattan	Cecil Howard, Fort Scott
Homer Griffin Bryson, Manhattan	David Marion Howard, Manhattan
Bernard Charles Burns, Manhattan	Mary Melvinia Hungerford, Manhattan
Robert Burns, Keats	†Ralph Edward Hunter, Palmer
Henry Bushong, Everest	Raymond Hunter, Manhattan
Constantine Diamandis Calogieris, Panagia, Greece	Jerry Dellard Jarmon, Coffeyville
Alvin Carlson, Morganville	†Lulu Johnson, Walsburg
Ivy Eldreth Case, Alta Vista	Marian Jordan, Manhattan
Edward Henry Cass, Wakeeney	Robert Cathcart Keys, Winchester
Hazel Dell Chaffee, Bazine	George Brent Kimport, Delvale
Benjamin Finley Clapham, Manhattan	Jordon Carroll King, Ewing, Ill.
Walter Coates, Wallace	Vesta Euleia Kinyon, Vernon
Ernest Benjamin Coffman, Lawrence	Sadie Mortena Kirkemunde, Council Grove
Marguerite Collins, Belleville	Arthur Sellard Kitchen, Burlingame
Alta Mamie Couch, Gardner	†Lydia Knabe, Gardner
Gladys Marie Counter, Enterprise	Raymond Scott Knox, Jetmore
Emery Melborn Cox, White City	Rudolph Henry Kobes, Manhattan
Arthur Weston Crocker, Matfield Green	Charles Walter Koch, Argonia
Ruth Brown Crowson, Manhattan	Edna Mary Kohler, White City
Pearl Edwinnie Dakin, Green	Herman Krauss, Sedgwick
Marion Clifford Danby, Cassoday	Jerry Emil Kubik, Caldwell
Kathryne Dappen, Lost Springs	Zelma Fay Kyner, Sharon Springs
Pearl Katharine Day, Dwight	Vernon Russell Lee, Norton
Ruth Derby Dean, Lawrence	Paul Addle Lindholm, Cheney
William Garrett DeBaum, Bushong	Louis Frank Linscott, Farmington
Henry Roy DeLair, Coldwater	Adelia Louis Lowe, Park
Myrtle Clare Dickerhoof, Manhattan	Robert William Lucas, Clearwater
Mina Bellamy Dodge, Manhattan	Harley Morgan Luse, Garnett
Roy Elmer Drown, Manhattan	Gerard Lyle, Manhattan
Carl Herbert Dunham, Havensville	Frank Donald Lynch, Ness City
Leo Tharpe Dysart, Douglass	†Waldean McAlister, Frankfort
Jennie Eleanor Edgerton, White City	Amos McBride, Manhattan
Arnold Englund, Falun	Winifred Owen McCarty, Ames
Anna Roxana Erikson, Junction City	Emma Ruth McClenahan, Manhattan
Vern Glen Ewing, Padonia	Erroll McDermed, Hutchinson
Wesley James Farrell, Manhattan	Oakley Calvin McIntosh, Palmer
Grace Elizabeth Finney, Ogden	Franz Joseph Maas, Alta Vista
Pearl Edith Finney, Ogden	Duella Mae Mall, Manhattan
Ada Rae Raechel Flinn, Bogue	Porter Marshall, Clay Center
Harry Adelfort Flinn, Bogue	Rolland Sylvester Mather, Grinnell
Innocent Ignatious Floersch, Manhattan	Hazel Irene May, Manhattan
James Perry Freeland, Horton	Hobart Irwin May, Seward
Mrs. Florence May Garinger, Manhattan	Editha Allene Mayfield, Manhattan
†Helen Gearhart, Clearfield, Pa.	Milton Miermaster, Abilene
†Allen Edward George, Liberal	William Cloud Mills, Lake City
Keith William Gilbert, Simpson	Halford Ernest Moody, Riley
Florence Mae Giles, Santa Fe	Luella Lucille Morris, Wichita
Fred Roy Glover, Wamego	Mark Allen Mortimer, Manhattan
Glover Irvin Godwin, Council Grove	Frank Adolphus Moyston, Wichita
Fannie Harriet Gorton, Manhattan	Iva Manilla Mullen, Labette
Laurence Simpson Graham, Clifton	Walter Hicks Murdock, Clifton
Marion Abraham Graham, Manhattan	Ruth Inez Murphy, Manhattan
	William August Naher, Kansas City, Mo.

† Housekeepers' course, fall and winter terms.

‡ Short course, winter term.

SCHOOL OF AGRICULTURE—SPECIALS—continued

Carrie Ada Neusbaum, Manhattan	Glenn Rogers Silkman, Manhattan
Ernest Lowell Nicolay, Manhattan	Wallace Bruce Simpson, Wichita
Vernon Carl Noble, Green	Glenn Earl Sitterly, Manhattan
Johanna Nolan, Junction City	Ramah Sitterson, Manhattan
Leonard Fritz Norlin, Johnson	Grace Ruth Skinner, Marshall
Ralph Nutter, Morrowville	Caroline Elizabeth Sloop, Manhattan
Ancil Klein O'Brien, Kansas City	Adah Joan Songer, Manhattan
Harold Temple O'Neil, Winfield	Fanny Myrtle Spaniol, Plevna
William Frank Orr, Manhattan	Donald Neelands Spencer, St. John
Etoila Matilda Orth, Manhattan	Kenneth Roland Spencer, St. John
Frederick Joseph Otnes, Fort Riley	Stewart Ward Spencer, St. John
George Virgil Overstreet, Blue Rapids	Robert Cleveland Spratt, Kansas City
Blanche Lore Palmer, Abilene	Walter John Steven, Lawrence
Carl Leon Parr, Rossville	Ward Clinton Stout, Arkalon
†George Walter Patterson, Manhattan	Mabel Manghild Swanson, Norcatur
Gladys Isabell Patterson, Clifton	Harold Hetherington Theiss, Hutchinson
Clinton Perkins, Oswego	Nellie Titus, Wakarusa
Phoebe Peterson, McPherson	George Oswald Tolman, Paola
Gertrude Pfeil, Manhattan	Ruby Lillian Travis, Manhattan
Lenwood Peter Jacob Plaum, Cripple Creek, Colo.	Nola Andrew Turner, Dunlap
Fred Pollom, North Topeka	Alexander Urbanowich, Newton
Valentine Henry Portz, Meriden	Vernon Velthoen, Manhattan
Clarence Benedict Quigley, Blaine	Herman Martin Vesper, Topeka
Frank Leigh Randall, Wichita	Samuel Winfield Walker, Lawrence
Ward Irving Reed, Havensville	Christian Weber, Abilene
Leslie Vernon Richards, Falun	John David Weber, Manhattan
Anna Corinne Riley, Reece	Thomas Edgar Welch, Emporia
Charles William Rippetoe, Havana	Myrtle Ione White, Jewell
Harold Dewey, Rothrock, Lawrence	Helen Elouise Wilcox, Hartford
Charlie Edward Ruff, Hodgeman	Thelma Geraldine Wilkerson, Topeka
Lee Stewart Rundell, Independence	George Edward Wilkinson, Russell Springs
Burr Colonel Russell, Winfield	Charles Aral Williams, Sedgwick
Ethel May Ruthruff, White City	Florence Mabel Williams, Manhattan
Lydia Esther Sandow, Dillon	Francis Reid Williams, Wakefield
Robert Earl Saxton, Everest	Albert William Wilson, Manhattan
Daniel Schmidt, Halstead	Roy Hals Williamson, Hutchinson
Helen Schneider, Logan	Jesse Collins Wingfield, Junction City
Edna May Schupbach, Hiawatha	Amy Inez Wismer, Pomona
Ennie Clark Scott, Elgin	Clara Rebecca Wismer, Pomona
Bess Irene Seitz, Manhattan	Chester Stanley Wood, Manhattan
Beryl Anna Severns, Marysville	Howard Kingsbury Woodbury, Olivet
Forest Wayne Shull, Glasco	Galen Gifford Wyatt, Chanute
Alta Beatrice Siegle, Lost Springs	Chester Ewart Yenawine, Manhattan

Special Students

AGRICULTURE

Wilbert Barrett, Randall	Dan Meimer McElvain, Fort Scott
Frank Harrison Beedle, Manhattan	George Burleson MacDonnell, Austin, Tex.
Ruskin Couch, Anthony	Leo Alphonsus Magrath, Williamsburg
Charles DeForest Davis, Louisville	Melvin Wayne Miller, Albuquerque, N. M.
John Monroe Dodrill, Stockton	Leslie Averill Plumb, Pleasanton
Hiram Knapp Ellingwood, Collinsville, Okla.	Charles Lorin Quear, Manhattan
Elmer Thomas Fitch, Randall	Robert Hall Rexroad, Darlow
Leroy Gillespie, Anthony	William Sterling Sparrow, Kansas City, Mo.
Donald Hudson, Palco	William Albert Stauffer, Marion
Herbert Humphrey, Wichita	Marc Taintor, Homer, Minn.
Jess King Kershner, Concordia	Claud Morton Vance, Paradise, Tex.
Lewis Leroy Leeper, Manhattan	James Walter Zahnley, Manhattan

VETERINARY MEDICINE

Paul Kitchell Baker, Cherryvale	Charles Earl Long, Blue Mound
Aaron Andrew Brecheisen, Edgerton	Newton Allen McCosh, Longford
David Maxon Greene, Manhattan	Harold Granville Newton, Manhattan
Elbridge Grubb, Fulton	LaRoy Noyes, Manhattan
Arthur James Hoffman, Manhattan	Lloyd LeRoy Whitney, Lyndon
Henry Hoffman, Princeton	Leon Brewer Wilson, Manhattan
Chester Anderson King, Emporia	

† Short course, winter term.

MECHANIC ARTS

James Cavanaugh, Manhattan	Frank Blair LaBetreux, Garden City
George Samuel Clinton, Leavenworth	Daniel Joseph McGinty, Junction City
Joseph Louis Collins, Morland	Hubert Aloysius McNamee, Junction City
Lester Henry Drayer, Manhattan	Ross James Maltby, Salina
Robert McKinley Goodwin, Belleville	Frank Stanley Papez, Milwaukee, Wis.
†Ray Everett Hall, Natoma	Paul Stuewe, Alma

HOME ECONOMICS

Mame Barrett, Barrett	Lenore Christabel Jefferis, La Crosse
Dora Wilhelmina Bayer, Toronto	Ethel O'Clair Jones, McPherson
Flora John Brown, Billings, Mont.	Nelly Evelyn Jones, McPherson
Lela Jassamine Bryan, Jonesboro, Ark.	Irma Leah Moore, Holton
(Mrs.) Wilhelmina Burk, Manhattan	Anna Belle Morgan, Hutchinson
Katharine Carr, Manhattan	Emilie Peristiano, Athens, Greece
Maud Irene Falkinburg, Cullison	Nealie Harbaugh Scholz, Frankfort
Bertha Funk, Ransom	Esther Mahel Speiser, Courtland
Mary Emma Giles, Manhattan	Arvia Ethel Spencer, Mound Valley
Eunice Lucile Hamm, Grantville	Viola Margaret Stiles, Leavenworth
Izetta May Hart, Fredonia	(Mrs.) Evangeline Wareham, Manhattan

GENERAL SCIENCE

Charles Boyce Abernethy, Omro, Wis.	Huldah Blackledge Keith, Manhattan
George Robert Allingham, Manhattan	Julia King, Manhattan
Mrs. N. Elizabeth Askren, Manhattan	Hazel Kloeffer, Manhattan
Mary Baird, Cherryvale	Chauncey Glenn Lewis, Manhattan
Rebecca Pauline Bartholomew, Atlanta, Ga.	Gertrude Murel Loomis, Alton
Stella Clara Beardsley, Russell	Ethel May Loring, Manhattan
Mattie Thelma Been, Shallow Water	Fern MacLean, Manhattan
Lila Ruth Beggs, Washington	Daisy Lewelling Mortimer, Manhattan
Florence Emslie Bickel, Barnes	†Chester Cecile Morse, Phillipsburg
Georgiana Fisk Burt, Eureka	George Milton Nelson, Lindsborg
Lucretia Marshall Canary, Manhattan	Nettie Humfeld Newman, Manhattan
Bessie Lavera Carp, Wichita	Grace Irene Pattin, Topeka
Ray Kester Chambers, Milford	Lulu Helen Pence, Baldwin
Rosdel Watson Childs, Chanute	Phæbe Elva Phillips, Manhattan
Mary Carley Cleavinger, Lowemont	Mary Hazel Phinney, Russell
Margaret Eunice Colwell, Emporia	Alice Irene Rea, Miltonvale
Joseph Burns Cross, Garnett	Lucy Lee Reed, Manhattan
Jessie Hedden Davis, Manhattan	Lenore Richards, Manhattan
William Vernon Davis, Manhattan	Cecil Richmond, Parsons
Mrs. Lettie Dickinson, Eureka	Mildred Mae Roadhouse, Portis
Jessie Diefendorf, Manhattan	Gladys India Roderick, Attica
Georgia LaFave Donaldson, Manhattan	Charles Nelson Root, Manhattan
Marcia Dunlap, Manhattan	William John Rosenhoover, Everest
Guy Leo Earl, Eskridge	Ruth Ross, Burr Oak
Flora Ewing, Manhattan	Mary Margaret Ryan, Manhattan
Emma Flora Fecht, Kansas City	†Karl Fred Schwake, Newton
Edna May Florell, Jamestown	Mae Skinner, Manhattan
†Jeanne Forrester, Manhattan	Blanche Ellen Smith, Wa Keeney
Paul Nathaniel Forst, New York City	Dorothy Knostman Smith, Council Grove
Herbert Linwood Freese, Wakefield	Everett Southward Stephenson, Wichita
Mildred Pearl French, Manhattan	Helen Lela Stigers, Manhattan
Herman Andrew Gehrke, Herington	Amelia Cora Still, Manhattan
Lester Paul Greenbank, Little River	Esther Hanzina Swanson, Manhattan
Lillian Guthrie, Topeka	George Arthur Swift, Salina
Edward Haug, Leavenworth	Wilma Anna Kammeyer Thompson, Man-
Florence Heizer, Osage City	hattan
Elsie Nora Howard, Colby	Alice Douglas Tomson, Manhattan
Cora Vernon Hungerford, Manhattan	Sarah Schmerle Ulrich, Manhattan
Lula May Hungerford, Soldier	Grace Utt, Manhattan
Edith Brooks Inskip, Manhattan	William Frank Veatch, Girard
Callie Dot Jennison, Healy	Mrs. Florence Vining, Manhattan
Ambrose Mathew Johnston, Manhattan	Loran Scott Wagener, Manhattan
Ethel Maurine Joss, Topeka	Lillian Ruth Wallace, White City
†Florence Joyce, Topeka	Hazel Emma Weber, Manhattan

MUSIC

Theodore Eugene Arnold, Westmoreland	Lawton Morrison Hanna, Clay Center
Myrtle Pearl Broberg, Manhattan	Esther Eiffle McCoy, Imperial, Neb.
Roy Edward Carr, Oakley	Ellis Morrill Moore, Manhattan
Gertie Gay Cope, Norton	Charles Nichols, Girard
Donna Mae Crane, Larned	Ruth Bernetta Rathbone, Manhattan
Ruth Crane, Larned	Bernice Pratt Schroer, Manhattan
Nina Bess Curry, Norton	Mildred Christena Warring, Larned

† Short course, winter term.

† Housekeepers' course, fall and winter terms.

Summer School

Walter Brown Adair, Osawatomie
 Cecyle Valentine Adams, Junction City
 Hazel Dell Adams, Junction City
 Katherine Maurine Adams, Manhattan
 Charles R. Adamson, Erie
 Pearle Akin, Manhattan
 Edith Louise Alsop, Wakefield
 James Edgar Alsop, Wakefield
 Harold H. Amos, Manhattan
 Helena Marie Anderson, Garden City
 Ruth Helen Anderson, Dodge City
 Esther Etta Andrews, Manhattan
 Alfred Carroll Apitz, Manhattan
 Frank Pittenger Applebaugh, Cherryvale
 Sara Arganbright, Wamego
 Mary Edith Arnold, Cottonwood Falls
 Harry Grant Avery, Wakefield
 Bagdasar Krekor Baghdigian, Topeka
 Mary Maria Baird, Cherryvale
 Stanley B. Baker, Manhattan
 John William Barker, Eurata
 Clara Sophia Barkmann, Junction City
 Carroll Meuller Barringer, Manhattan
 Estella Barnum, Manhattan
 Amy Rachel Barlow, Coldwater
 Wood Bass, El Dorado
 Matilda Alice Batliner, Colby
 Henry Benjamin Bayer, Quincy
 Edna Louise Beckman, Manhattan
 Frank Harrison Beedle, Manhattan
 Orie Walter Beeler, Manhattan
 Albert William Bellomy, Manhattan
 Lois Viola Bellomy, Manhattan
 Frank F. Bergier, Manhattan
 Elsie Kathryn Bergstrom, May Day
 Rose Eleanor Berner, Kansas City, Mo.
 Ary Clay Berry, Topeka
 Hazel Virginia Beverly, Manhattan
 Edna Nadine Bigelow, Gardner
 Mary Avis Blain, Manhattan
 Darius N. Bowers, Almena
 Jesse Earl Bowers, Simpson
 Helen Margaret Boyd, Norton
 Viola Margaret Brainerd, Paola
 Ruth Hazel Branch, Manhattan
 James Hill Branham, Pittsburg
 James Senter Brazelton, Wathena
 Mabel May Broberg, Manhattan
 Myrtle Broberg, Manhattan
 Hanah Laura Brock, Kansas City, Mo.
 Geneveve Anna Brooks, Kansas City, Mo.
 William Hurbert Brooks, Stafford
 Alfred Allen Brown, Norton
 Elmer Louis Brown, Great Bend
 George D. Brown, Olathe
 Gertrude Olive Brown, Norton
 Hazel Elizabeth Brown, Manhattan
 Pearl Jennie Brown, Caldwell
 Genevieve Vador Bruce, Manhattan
 Wesley Gordon Bruce, New York City
 Margaret Bruce, Marquette
 McArthur Baptiste Brush, Newton
 Hallie May Bryson, Manhattan
 Harry Ray Bryson, Manhattan
 Arthur Newton Burditt, Ness City
 Wayne Eugene Burnette, Parsons
 Daniel Madison Bursch, Manhattan
 Bernice Burt, Eureka
 Georgiana Fisk Burt, Eureka
 Cora Gertrude Campbell, Junction City
 Hazel Berdella Campbell, Manhattan
 Helen Carey, Manhattan
 Lucile Margaret Carey, Manhattan
 Esther Elnora Carlson, Kansas City, Mo.
 Ida Alfreda Carlson, Manhattan
 Bessie Lavera Carp, Wichita
 Fred Harrison Carp, Wichita
 Margie Ellen Carpenter, Concordia
 Samuel Roscoe Cellars, Chetopa
 DeLoss Chapin, Manhattan
 Edna Chapin, Manhattan
 Imogene Marjorie Chase, Manhattan
 Richard Clay Chatman, Manhattan
 Julia Eleanor Cheney, Great Bend
 Grace Myrtle Christman, Sterling
 Cecil Orr Chubb, Baxter
 Helen Claassen, Newton
 Lizzie Kathryn Claassen, Newton
 David Charles Clarke, Manhattan
 Edward Albert Clawson, Manhattan
 Alva Lee Cooper, Sharon Springs
 Helen Crane, Kansas City, Mo.
 Alverta May Cress, Manhattan
 Anna Edith Crissman, Hays
 Fava Marie Criner, McPherson
 Arthur Weston Crocker, Matfield Green
 Claude Brownley Cross, Manhattan
 Blaine Crow, Manhattan
 Mrs. Mattie Crow, Manhattan
 Ruth Brown Crowson, Manhattan
 Rose Matilda Cunningham, Manhattan
 Grace Currie, Manhattan
 Charles Elbert Curtis, Manhattan
 Robert Elliott Curtis, Manhattan
 John T. Curtis, Ogden
 Robert Grant Cushman, Emporia
 William Renwick Curry, Dunavant
 Vilona Cutler, Anthony
 Tena Dahl, Hillsboro
 Francie Daily, Beloit
 Pearl Edwinnee Dakin, Green
 Edna May Danner, Topeka
 Mary Thresa Danner, Topeka
 Anna Kathryn Dappen, Lost Springs
 Vernon Hilard Davidson, Holton
 Bonne Beatrice Davis, Fredonia
 Hallan Walker Davis, Manhattan
 Iva Mae Davis, Nortonville
 Myrtle Ellen Davis, Clay Center
 Marjorie Dean, Manhattan
 William Deitz, Overland
 George Ernest Denman, Manhattan
 Percy LeRoy DePuy, Girard
 Harriett Deweese, Wamego
 Donald E. Dewey, Fort Scott
 Sarah May Dewey, Manhattan
 Florence Lillian Dial, Manhattan
 Nora Benton Dibrell, San Antonio, Tex.
 Marie Dick, Newton
 Frank Dillenback, Manhattan
 Grace Elizabeth Donaldson, Manhattan
 Oscar Theodore Doran, Alden
 Myrtle Dougherty, Manhattan
 Arthur Douglas, Manhattan
 Henry Downie, Denison
 Frank Elsworth Dowling, Manhattan
 Lester Henry Drayer, Manhattan
 George Milton Drumm, Manhattan
 Mary Rebecca Dunlap, Eureka
 Nadia Dunn, Manhattan
 Harry Lawrence Eibert, Green
 Nita Grace Ellsworth, Formosa
 Bessie Emmons, Haddam
 Maude Emmons, Haddam
 Emma Juanita Engle, Abilene
 Frances Jean Engel, Manhattan
 Esther Elizabeth Ericson, Manhattan
 Mina Grace Erickson, Manhattan
 Arline Jessie Faley, Manhattan
 Gladys Winifred Faley, Manhattan
 Rose Farquhar, Manhattan
 Martha Fern Faubion, Manhattan
 Grace Mirriam Ferguson, Manhattan
 Mildred Fessenden, Clifton
 Christina Grace Figley, Kansas City

SUMMER SCHOOL—continued

Mary Elizabeth Fink, Formosa
 Alice Rokestron Fitch, Manhattan
 Roland Osborn Flanders, Manhattan
 Irl Ferris Fleming, Manhattan
 Claude Fletcher, Hiawatha
 Marion Rosina Fowler, Brookville
 Marion Forbes, Carbondale
 Ethel Foreman, Kiowa
 Eleanor Eugenia Foreman, Beatrice, Neb.
 Blanche Forrester, Manhattan
 Harvey Dwight Franklin, Horton
 Ralph Franklin, Horton
 Frances Elma French, Winchester
 Ruth Esther Frush, Kansas City.
 Grace Gardner, Hartford
 Sarah Jane Gardner, Tampa
 Daniel Oren Garman, Kensington
 Ethel Victoria Garrett, Manhattan
 Roy Preston Garrett, Manhattan
 Ray Gatewood, Manhattan
 Rose Carolyn Geistfeld, Washington
 George Calvin Gibbons, Topeka
 Lura Gilmore, Manhattan
 Elizabeth Emma Gish, Manhattan
 Gladys Gist, Manhattan
 Edith Sara Glasscock, Kansas City
 Natalie Helen Goldsmith, Athol
 Teresa Goodwyn, Minneapolis
 Isabel Gordon, Manhattan
 Helen Hannah Gorton, Manhattan
 Helen Isabell Gott, Manhattan
 Margaret Belle Green, El Dorado
 Edna Gulick, Winfield
 Laura Annie Gustafson, Stockdale
 Dorothy Etta Hadley, Topeka
 Blanch Mary Haggman, Kackley,
 Mabel Elizabeth Haggman, Kackley
 Ruth Mildred Hall, Belleville
 Hattie Halverstadt, Oxford
 Elizabeth Rebecca Hamilton, Manhattan
 Marguerite Hammerly, Manhattan
 (Mrs.) Mary Paisley Hammett, Francis
 Robert John Hanna, Mankato
 Amy Irene Hanson, Syracuse
 Mary Johanna Hanson, St. George
 Lucile Evelyn Harbaugh, Conway Springs
 Alice Tibbetts Harkness, Lakin
 Harriet Helen Harper, Wellington
 Vida Agnes Harris, Manhattan
 Zora Harris, Manhattan
 Stella Maude Harriss, Manhattan
 Margaret Hartwig, Goodland
 Iva Miller Hassler, Chapman
 Floyd Hawkins, Marysville
 Ferdinand Eugene Hayes, jr., Manhattan
 Helen Edith Hayes, Manhattan
 Thornton Hayes, Manhattan
 Dorothy Louise Heartburg, Manhattan
 Lena Hendel, Blue Rapids
 Llewellyn Glenn Hepworth, Manhattan
 Andrew Herold, Seneca
 Margaret Buford Hibben, Kansas City
 Charlie William Hikok, New Ulysses
 Anna Higinbotham, Manhattan
 Frances Hildebrand, Coffeyville
 Reginald Hinde, Manhattan
 Olind Arthur Hindman, Rush Center
 Mabel Ellen Hinds, Manhattan
 Douglas Hine, Manhattan
 Earl Wilkie Hitchcock, Columbus
 Earl Theodore Hockersmith, Manhattan
 Freda Anna Hoerman, Linn
 Juanita Hoke, Manhattan
 Harry Stewart Holden, Manhattan
 Bertha Belle Hole, Manhattan
 Lillian Hope, Sylvia
 Henry Robert Horak, Munden
 Esther Lydia Hostetler, Manhattan
 Walter Wynne Houghton, Emporia
 Belle Clarke Howard, Manhattan
 Dwight Ellsworth Hull, Manhattan
 Lulu May Hungerford, Manhattan
 Ruth Hutchings, Manhattan
 Louis Edgar Hutto, Manhattan
 Myrtle Winona Hutto, Manhattan
 Albert Ellis Hylton, Manhattan
 Pansy Mary Jackson, Manhattan
 Christian Theodore Jacob, Ottawa
 Perry Leonard Jacobs, Kansas City, Mo.
 James Lawrence Jacobson, Waterville
 Ruth Mary Jacobson, Formosa
 Pauline Jacques, Independence
 Pearl LaClaire Jacques, Hamlin
 James Wilburn Johnson, Manhattan
 Mary Alberta Johnson, El Dorado
 Marguerite Johnson, Manhattan
 Marie Johnston, Manhattan
 Anwel Edwin Jones, Wymore
 Edna Jones, Manhattan
 Donald Smith Jordan, Topeka
 Winifred Alexander Jordan, Manhattan
 Mabel Anna Kanaga, Winfield
 John Keene, Ottawa
 Edith Loree Kelly, Olathe
 Exie Lee Kelly, Manhattan
 Floyd Brode Kelly, Kansas City, Mo.
 Lillian Sarah Kennedy, Winfield
 Harry Llewellyn Kent, Manhattan
 Inez Eggert Kent, Franklin, Neb.
 Leila May Kent, Franklin, Neb.
 Lillian Marie Kerns, Canton
 Charles Vincent Kershaw, Garrison
 Earl Kesinger, Greensburg
 Charles James Keyes, Manhattan
 Margaret Belle King, Manhattan
 John Kiene, Valencia
 Chester King, Emporia
 Tillie Marie King, Protection
 Vesta Eullee Kinyon, Manhattan
 Flora Einsel Kirk, Manhattan
 Iva Leona Kirk, Belleville
 Otis Bert Kirk, Manhattan
 Elizabeth Emily Kirkpatrick, Manhattan
 Evelyn Nellie Kizer, Manhattan
 Ruth DeVerre Knapp, Kansas City, Mo.
 Vera Kathleen Knitile, Manhattan
 Fred Albert Korsmeier, Manhattan
 Sarah Elma Lacey, Russell
 Robert Roy Lancaster, Manhattan
 Mary Steven Lane, Manhattan
 Lillian Antoinette Lathrop, Manhattan
 Bertha Blanche Lauger, Manhattan
 Clay Forrest Laude, Lyons
 Esther Ruth Leary, Gaylord
 Lavinia Leibengood, Paola
 Mabel Lorraine Leuszler, Linn
 Hazel Marie Lindley, Leon
 Marc Lindsay, Manhattan
 Mollie Lindsey, Wellington
 Nellie Lindsay, Wellington
 Howard Allyn Lindsley, Manhattan
 Catherine Linhart, Irving
 James Ralph Little, Topeka
 Emily Doris Lofnck, Manhattan
 Josie Long, Manhattan
 Marie Long, Manhattan
 Nelle Florence Longenecker, Kansas City
 Grace Adella Low, Stockton
 Geta Lund, Manhattan
 Dorothy Elizabeth Lush, Altamont
 Daniel Gail Lynch, Manhattan
 Reah Jeannette Lynch, Manhattan
 Effie Evelyn Lyons, Topeka
 Elizabeth McCall, Wa Keeney

SUMMER SCHOOL—continued

Elva May McCall, Iola
 Harold Mark McClelland, Manhattan
 John Robinson McCune, Manhattan
 Newton Allen McCosh, Longford
 Vera Anna McCoy, Imperial, Neb.
 Vergie McCray, Manhattan
 Nina Elizabeth McCullough, Belleville
 Cecil Lyman McFadden, Stafford
 Everett Raymond McGalliard, Troy
 Riley Edward McGarraugh, Mulvane
 Buell Elbert McIntosh, Wilsey
 Clayton McIntosh, Washington
 Oakley Calvin McIntosh, Palmer
 Hazel McKee, Caldwell
 Helen Sarah McKinlay, Manhattan
 Mary Elizabeth McKinlay, Manhattan
 Eugene McLain, Sun City
 Clyde McMindes, Portis
 Beulah Lillis McNall, Gaylord
 Gladys Rose McQuerrey, Caldwell
 Jay Mader, Manhattan
 Leonard Hemington Male, Wakefield
 Pearl Hattie Mann, Augusta
 Mabel Marlowe, Hartford
 Carroll Dean Marquis, Manhattan
 Helen Elizabeth Martin, Junction City
 Lowell Marston Mason, Belle Plaine
 Kittie May, La Cygne
 Charlotte Mayfield, Manhattan
 Lewis Augustin Maury, San Antonio, Tex.
 Carrie Mendenhall, Burden
 Edna Mabel Metz, Jewell
 Lloyd Metzler, Manhattan
 Chester Middleton, Manhattan
 Anna Lora Miller, Hoisington
 Cecil Elizabeth Miller, Hoisington
 Leroy Nelson Miller, Manhattan
 Fred Weymouth Milner, Hartford
 Clifford Mitchell, Holton
 Ernest Walter Mitchell, Manhattan
 (Mrs.) Grace Mitchell, Manhattan
 Harrison Mitchell, Manhattan
 Helen Mitchell, Manhattan
 June Etta Mitchell, Tecumseh
 Mayme Estella Mitchell, Tecumseh
 Millage Montgomery, Pomona
 Florence Edna Moon, Manhattan
 Daisy Ellen Moore, Hiawatha
 Allyson Harry Moore, Manhattan
 Robert Ellsworth Mohler, McPherson
 Laura Duella Moore, Chanute
 Mabel Grant Moore, Cincinnati, Ohio
 Sherman Benton Moore, Manhattan
 Thomas Moore, Manhattan
 William Briney Moore, Manhattan
 Ida Katherine Moriarty, Wamego
 Clytie Morley, Clyde
 Riley Earl Morgan, Courtland
 Grace Morris, Kansas City
 Elizabeth Glenday Mortimer, Delphos
 Charlotte Morton, Ellsworth
 Elizabeth Lovinia Morwick, Eskridge
 Leo Clifford Moser, Courtland
 Mary Rose Moss, Eureka
 (Mrs.) Frances Lucille Moye, Lenora
 Hattie Rosella Mullen, Labette
 Zenith Mullen, Labette
 Florence Catherine Mulvey, Wichita
 Kathrina Munger, Manhattan
 Jane Murphy, Clyde
 Charlotte Cornelia Mutschler, Leonardville
 Hazel Helen Myers, Sylvia
 Telie Nafziger, McPherson
 Blanch May Nason, Manhattan
 John Rogers Neale, Manhattan
 Peter Leatherman Netterville, Manhattan
 Winifred Louise Neusbaum, Manhattan
 George Raymond New, Emporia
 Harold Newton, Manhattan
 Eunice Nicolay, Manhattan
 Bessie Nixon, Peck
 Mamie Norlin, McCracken
 William Axtell Norman, Manhattan
 Wendell Nyström, Savonburg
 Floyd Earl Oakes, Gypsum
 Millie Sophia Oltmans, Halstead
 Raymond Smith Orr, Manhattan
 Maude Adeline Osbourne, Randolph
 Merl Lee Padgett, Manhattan
 Lita Mae Paine, Admire
 Vernon Emery Paine, Admire
 Laura Gertrude Palmer, Phillipsburg
 Frank Stanley Papez, Manhattan
 (Mrs.) Nellie Parker, Manhattan
 Sara Jane Patton, Hiawatha
 Oscar Willy Felix Paulsen, Manhattan
 Helen Payne, Parsons
 Nellie Maria Payne, Manhattan
 Esther Virginia Peck, Manhattan
 Laurence Todd Perrill, Plevna
 Annette Woodward Perry, Manhattan
 Olivia Esther Peugh, Hutchinson
 Howard Phillips, Hutchinson
 William Dale Pierce, Manhattan
 Zelma Roena Platt, Mankato
 Anna Poland, Lyons
 Iva Holt Porter, Glen Elder
 Evelyn Marie Potter, Barnes
 Nina Mae Powell, Manhattan
 Gourney Augusta Prier, Marion
 Ida Florence Pringle, Manhattan
 Ernest Henry Ptacek, Emporia
 Edyth Purcell, Manhattan
 Grosvenor Ward Putnam, Manhattan
 Edith Clare Quigley, Blaine
 Joseph Vincent Quigley, Blaine
 George Hemrod Ralsback, Oberlin
 Gladys Ramey, Coffeyville
 Grace Elizabeth Ratliff, Ogden
 Edna Irene Rawlings, Eureka
 Sidney Breese Replogle, Cottonwood Falls
 Jessie Annabula Reynolds, Manhattan
 Juanita Reynolds, Canton
 Lloyd Dennis Reynolds, Rush Center
 George Willis Rhine, Manhattan
 Ruth Myrtle Ridley, Topeka
 Glenn Amiel Riley, Manhattan
 Edward Sherrill Roberts, Manhattan
 Kenneth Lindsey Roberts, Manhattan
 John Lee Robinson, Arkansas City
 Maybell Rodgers, Cherryvale
 Helena Roesler, Junction City
 Margaret Maude Rogers, Clyde
 Iva Melissa Rogers, Mayfield
 Paul Hughes Roose, Belle Plaine
 Helen Ross, Manhattan
 Nellie Katherine Roswurm, Manhattan
 Madge Rowell, Strasburg, Mo.
 Hazel Russell, Wichita
 Leah Belle Ryan, Manhattan
 Mary Margaret Ryan, Manhattan
 Mary Josephine Sachau, Manhattan
 Glenn Charles Salisbury, Hays City
 Samuel Cecil Salmon, Manhattan
 Margaret Schattensburg, Manhattan
 Leah May Schmitt, Ellsworth
 Neita Schmitt, Ellsworth
 Margaret Ursula Schneider, Logan
 Eda Lillian Schowalter, Halstead
 Margaret Washburn Schultz, Manhattan
 Albert Dale Schwartz, Manhattan
 Sammie Schwensen, Junction City
 Winfield Scott, Manhattan
 John Sellon, Manhattan
 Floyd Samuel Semisch, Keighley
 Aurilla Fidelia Sharp, El Dorado
 Bessie Laura Sheaff, Kansas City
 Peryl Hazell Sheldon, Grand Island, Neb.
 Bertha Mae Shepard, Nortonville

SUMMER SCHOOL—*continued*

Laura Edna Shingledecker, Manhattan
 Marguerite Simonson, Manhattan
 Alta Siegle, Lost Springs
 Mabel Clara Sitterly, Manhattan
 Alberta Aurelia Smith, Manhattan
 Elbert Lewis Smith, Rosedale
 Florence Hazel Smith, Great Bend
 Henry Edwin Smith, Manhattan
 Mary Henrietta Smith, Manhattan
 Mollie Manerva Smith, Westphalia
 Paul Walter Smith, Osborne
 Stanley Albert Smith, Manhattan
 Vesta Smith, Parsons
 Harold Wyllis Shell, Manhattan
 Francis Lawrence Snow, Manhattan
 Lloyd Emerald Souders, Manhattan
 Robert Cleveland Spratt, Kansas City
 Sadie Isabelle Steinheimer, Dodge City
 Rosa Belle Steele, Manhattan
 Nettie Elizabeth Steinheimer, Dodge City
 Roy Lee Steinheimer, Dodge City
 Charles George Stiensmeyer, Leavenworth
 Helen Lela Stigers, Manhattan
 Amelia Cora Still, Manhattan
 Ada Caroline Stoddard, Manhattan
 Rose Elizabeth Straka, McPherson
 Julia Rena Strand, Independence
 Helen Margaret Strite, Salina
 Lauretta Victoria Sumners, Manhattan
 Abbie Swafford, Manhattan
 Lillian Eleanor Swanson, White City
 Mabel Josephine Swanson, White City
 Paul Daniel Swayze, Lawrence
 Clifford Swenson, Lindsborg
 Blanch Lovina Tanner, Manhattan
 Byron John Taylor, Chapman
 Gleda Genevera Taylor, Manhattan
 Irene Alma Taylor, Chapman
 Lorena Belle Taylor, Manhattan
 Mary Hobbs Taylor, Fort Scott
 Nell Taylor, White Cloud
 Ernest Teaford, Norton
 Robert Terrill, Manhattan
 Corrine Bertha Thiele, Hanover
 Louise Sophia Thiele, Hanover
 Charles David Thomas, Baxter Springs
 Esther Marguerite Thomas, Ogden
 Carl Pollard Thompson, Manhattan
 Mabel Thompson, Junction City
 Erwin Milton Tiffany, Manhattan
 Rose Viola Tipton, McPherson
 Mildred Tolles, Lawrence
 Alice Douglas Tomson, Manhattan
 Walter Edwin Tomson, Manhattan
 Bertha Truesdell, Lyons
 Lester Tubbs, Glade
 Katherine Ann Tucker, Topeka
 Mary Lee Turner, Manhattan
 Bertha Marie Unruh, Newton
 John Bennett Underwood, Glen Elder
 Mark Florea Upson, Saginaw, Tex.
 Mary Laura Valle, Junction City
 Mattie Louise Vance, Kansas City, Mo.
 Sidney Rendall Vandenberg, Manhattan
 Frank Van Haltern, Manhattan
 Phillip Cornelius Vilander, Peabody
 (Mrs.) Heath Vining, Manhattan
 Avis Louise Voak, Worthington, Minn.
 Roy Walden, Westmoreland
 Edith Mary Walsh, Manhattan
 Bess Walsh, Clay Center
 Frances Josephine Walsh, Clay Center
 Charlotte Pearl Wartenbee, Liberal
 Henry Jackson Waters, jr., Manhattan
 Martha Coats Webb, Caney
 Catherine Wells, Belleville
 Julia Veronica Wendel, Beattie
 Fred Wenn, Erie
 Edward Norris Wentworth, Manhattan
 Bula Mae Wertenberger, Manhattan
 Elnora Christina Westling, Green
 Carl Edward Wettig, Valley Falls
 Edwin Frederick Whedon, Oswego
 Edna Anita White, Jewell
 Julia Mav White, Manhattan
 Welton White, Jewell
 Lyndell Whitehead, Manhattan
 Clara May Whitescarver, Olathe
 Vera Whitmore, Manhattan
 Gladys Wilcox, Manhattan
 Flora Kathrina Wild, Oklahoma City, Okla.
 Bernice Wildman, Concordia
 Nelle Wilkie, Abilene
 Claud Merlin Willhoite, Manhattan
 Eulalia Elizabeth Williams, Spearville
 Horace Alfred Williams, Sylvan Grove
 Jennie Williams, Meriden
 Louise Coleman Williams, Manhattan
 Nina Marie Williams, Winfield
 Ruth Eveline Willis, Manhattan
 Isaac Edgar Wilson, Rocky Ford, Colo.
 Lorena Genevieve Wilson, Manhattan
 Daisy Evaline Wiseman, Manhattan
 Lois Emily Witham, Manhattan
 Eva Emmaline Wood, Manhattan
 Homer Carlton Wood, Manhattan
 Joel Earl Wood, Manhattan
 George Jerry Woods, Manhattan
 Elizabeth Pearl Woods, Wichita
 Lawrence Earl Woods, Newton
 Margaret Joan Worland, Seneca
 Wister Worthington, Manhattan
 (Mrs.) A. E. Wright, Manhattan
 Phillip Young, Manhattan
 James Walter Zahnley, Manhattan
 Lulu Mav Zeller, Manhattan
 Louise Ziller, Manhattan
 Louise Albert Zimmerman, Belle Plaine

Housekeepers' Course

Minnie Anderson, Palmer
 LaVinnie Olive Applegate, Ramona
 Marian Elizabeth Beardsley, Russell
 Hazel Lucille Beck, Manhattan
 May Elithe Belwood, Marshall, Mo.
 Helen Best, Manhattan
 Alce Bobek, Caldwell
 Millie May Boomer, Downs
 Pearl Bvers, Hiawatha
 Nellie Almeda Carlson, Garfield
 Mary Emma Carver, Coffeyville
 Frances Jane Case, Medicine Lodge
 Helen Edith Christ, Wichita
 Mona Corkill, Nortonville
 Bernice Faye Crawford, Hutchinson
 Helen Mary Cross, Sylvan Grove
 Helen Elizabeth Dale, Protection
 Anna Belle Delfs, Americus
 Dorothy Dunham, Manhattan
 Clara Anne Engel, Herington
 Esther Mathilda Erikson, Junction City
 Ethie Josephine Fager, Osage City
 Jeanne Elizabeth Forrester, Manhattan
 Ruby Marie Freeman, Scandia
 Mrs. Grace Gainey, Manhattan
 Elta Mathilda Garansson, Zeandale
 Mrs. Mary McKie Garrett, Manhattan
 Helen Elizabeth Gearhart, Clearfield, Pa.

HOUSEKEEPERS' COURSE—*continued*

Maude Ellen George, Liberal	Elsie Emma Mohler, Scott City
Louisa Clara German, Alta Vista	Anna Dora Mellies, Clifton
Amelia Sophie Gustafson, Topeka	Lizzie Menke, Hanover
Erva Harmon, White City	Martha Metz, Talmage
Helen Lucile Heiser, Tonganoxie	Flossie Marguerite Milleson, Oberlin
Gertrude Irene Hendricks, Glen Elder	Muriel Barbara Moore, Manhattan
Ruth Hendricks, Glen Elder	Frances Marian Moss, Eureka
Cecil Rose Hill, Basehor	Anna Evangeline Musil, Cleburne
Laura Elizabeth Hill, Scott City	Lizzie Edna Neufeld, Mound Ridge
Mary Avis Hill, Scott City	Sybil Grace Niver, Inman
Blanche Hiner, Beloit	Marie Nusz, Abilene
Flora Leone Hollenbeck, Idana	Esther Margaret Oehrle, Overbrook
Mildred Minnie Hollister, Sabetha	Bryan Frances O'Leary, Eureka
Christine Charlotte Holt, Marquette	Mary Louise Ott, Hamilton
Edna Maud Howell, Norton	Cassie Virginia Parrish, Cullvertson, Neb.
Ethel May Howell, Norton	Elsa Adeline Peiman, Vassar
Laura Anne Hyames, Dighton	Pearl Pence, Baldwin
Lillian Minnie Imthurn, Madison	Effie Peterson, Marquette
Agnes Alberta Jackson, Junction City	Emma, Lillian Pishny, Cleburne
Sadie Janssen, Lorraine	Emma Ploeger, Robinson
Elsie Ethel Johnson, Randolph	Vangie May Rechel, Hutchinson
Lula Anette Johnson, Walsburg	Katherine Reimer, Inman
Mildred Elvira Johnson, Garrison	Elizabeth Dorothy Ross, Baker
Myrtle Naomi Johnson, Leonardville	Esther Mabel Stagg, Manhattan
Marie Johnston, Manhattan	Bessie Stark, Coldwater
Harriett Inez Ruth Jones, Burden	Pearl Starr, Scott City
Florence Isabell Joyce, Topeka	Lena Harriet Stewart, Norton
Mary Magdalene Klassen, Inman	Florence Irene Swanson, Osage City
Lydia Matilda Knabe, Gardner	Mabel Van Tuyl, Basehor
Eva Myrtle Lacy, Coldwater	Betty Beatrice Waldo, Ellis
Rita Laidig, Danbury, Neb.	Leah Augusta Wallace, Vliets
Emmaline Elizabeth Lawrence, Herington	Mabel Beatrice White, Stockdale
Ruby Alpha Lawson, Sylvan Grove	Eva Ellen Williams, Sylvan Grove
Ruth Omega Lawson, Sylvan Grove	Alice Jean Woods, Anthony
Olga Emma Lebeda, Caldwell	Annie May Yeager, Bazaar
Esther Irene Lindholm, Cheney	Inez Anna Youngquist, Cleburne
Berenice Logan, Kansas City, Mo.	Laura Mae Zwiebel, Sedgwick
Gladys MacCallum, Kansas City	

Lunch-room Management

Eva Case Aiken, Macksville	Bertha Jane Boyd, Spearville
Lena Arcelia Badgley, Manhattan	Wilma Louise Davis, Manhattan
Jessie Louise Bailey, Topeka	Beryl May Houghton, Junction City
Bessie Beaumont, Valley Springs, S. Dak.	Ella Viola Kraft, Wichita
Ethelyn Pearl Beverly, Manhattan	Ruth MacKay, Thayer

Farmers' Short Course

SECOND YEAR

John Russell Andrew, Madison	Frank Larkins, Belleville
Merrill Smith Avery, Concordia	Reuben Fred Lawson, Olsburg
Movitz Baessler, Coldwater	J. T. Lear, Stafford
Dean Beardsmore, Concordia	Guilford Dudley Leslie, Ashland
Claude Levere Bowersox, Belleville	Leo Plato McClure, Havana
James Brownrigg, Mont Ida	Ralph McNergney, Sabetha
Robert Brownrigg, Mont Ida	Arthur Ray Miller, Aetna
Millard Bull, Lenora	Victor John Morton, Oberlin
William Frederick Carls, Wakarusa	Leslie Arbert Muck, Beloit
David Joe Cass, Collyer	Water Nicholson, Neale
Clarence Corcoran, Oberlin	Albert Hirschler Penner, Newton
Ralph Donald Collier, Alta Vista	Percy Vivian Peterson, Marquette
Charles Dalke, Hillsboro	Earl Harlan Prentice, Godrich
George Owen Dutton, Concordia	Osborne Russell Randall, Linn
George Lambert Eichler, Herington	Nels Ephriam Samuelson, Axtell
Lawrence William Eickman, Chester, Neb.	Kyle McKinley Schlaegel, Vermillion
Samuel Eitzen, Hillsboro	Karl Schwake, Hillsboro
Glen Frisbie, Kingman	Hartley Wesley Setchell, Morland
George Garrett, Bradyville, Iowa	Charles Edward Shean, Bellefonte
Charles Gettys, Wayne	Thomas Singular, Clifton
Ralph Arthur Grimm, Caldwell	Emil Henry Stueber, Sylvan Grove
Filmer Alfred Hammarlund, St. Marys	Floyd Daniel Streater, Denton
Herschel Harmon, White City	William Valentine Stutz, Utica
Charles Edward Hill, Manhattan	George Norman Twell, Studley
Laud Reeves Hill, Manhattan	Claude Guss Wehrman, White Cloud
Harry Hunt, Belleville	William Wolting, Sylvan Grove

FARMERS' SHORT COURSE—continued

FIRST YEAR

Carl Gustav Aberg, jr., Scandia	Arthur Isaac Hawkinson, Marquette
Phillip DeWitt Abbott, Manhattan	Edwin Chapin Headley, Miltonvale
Benton Rowles Anderson, Partridge	William Alfred Hegle, Lost Springs
Carl Einar Anderson, Scranton	Adolph John Hellwig, Oswego
Ruben Anderson, Riley	Arthur George Hiner, Scottsville
Peter Andres, Newton	Gilva Holloway, Jewell
Willis Thomas Ardrey, Stafford	Dan Holmes, Rozel
Walter Glen Austin, Irving	Frank Edgar Honnell, Everest
Russell Kenneth Ballou, Delphos	Albert Wright Houghton, Emporia
Elma Jackson Bare, Protection	Chester Hiram Hudson, Wa Keeney
Herbert John Barr, Larned	Richard Alexander Hudspeth, Ogden
Jacob Bartel, Hillsboro	Cecil Vale Huff, Oronoque
William Ira Beach, Martinsville	Lawrence Orlando Ireland, Holton
Clarence William Berg, Meriden	John Edward James, Mayetta
Raymond Elmer Bergsten, Randolph	William Paul Jennings, Little River
Henry Bletscher, Bala	Olin Smita Jewett, De Soto
Foster Raymond Blockolsky, Manhattan	Orval Ernest Jones, Belleville
Eugene Botkin, Fowler	Lewis Charles Kelly, Brewster
Glenn Gotkin, Fowler	Pewey Charles King, Overbrook
Walter Bowell, Kensington	Harry Leslie Kohler, Glen Elder
Louis Melvin Boyd, Larned	John Paul Krehbiel, Pretty Prairie
John Albert Brune, Lawrence	Bruce Kyle, Cawker City
Willis Edward Brune, Bethel	Amel Landgraf, Garden City
Julius Phillip Bruning, Robinson	Albert Lucas Langenwalter, Halstead
Paul William Bruning, Robinson	John Gustav Lentfer, Sylvan Grove
George Leonard Burton, Council Grove	Ray McKinley Leonard, Lyons
Clarence Byer, Hamlin	Edward Henry Linscheid, Arlington
Archer Bell Carlson, Formoso	Burney Loomis, Marquette
Frank Carlson, Garfield	Waldean McAlister, Frankfort
Mauritz Walter Carlson, Marquette	Neal Shorey McCarty, Tescott
Henry Jensie Carr, Jamestown	Leonard Glen McCune, Benton
John LaMonte Carson, Winchester	Dick Frank McKibben, Dodge City
John Michael Cavanaugh, Beloit	Floyd Edward McMurray, Jewell
Leon John Christensen, Manhattan	Adolph Daniel Mall, Clay Center
Albert Claassen, Whitewater	Ernest Jacob Mall, Clay Center
Walter Abraham Claassen, Whitewater	Aaron Rhade Markley, Mound City
Eimer Joseph Conroy, Manhattan	Hugh Marshall, Beaver City, Neb.
Clyde Crawford Coons, Stafford	Levi Meyer, Sabetha
Hall Isaac Cope, Norton	Marx Leopold Meyer, Hill City
Samuel Cowan, Manhattan	Alfred Stephen Moeller, Arnold
Chester James Crawford, Stafford	Ernest Fred Moellmer, Ludell
Oliver Francis Crispin, Webber	James Montgomery, Scranton
Clyde Walter Currie, Manhattan	Homer Vincil Moore, Mont Ida
John Shell Darsey, Ashland	Alexander Morse, Attica
Thomas Lewis Davies, Hiawatha	Robert Moyer, Edmond
George Francis Dillon, jr., Hope	Elmer Ellsworth Murphy, Maple Hill
Frederick Lee Doty, Cherryvale	Lloyd Hamilton Murphy, Edgerton
Cassius Douglas, Americus	Fred Leland Myers, Neosho Falls
Cornelius Ernest Dyck, Moundridge	Chester Nelson, Great Bend
Clarence Mills Easter, Scranton	Frank Emil Paul Nelson, Ogden
George Wilfred Eggerman, Manchester, Okla.	Walfred August Nelson, Ogden
Hiram Knapp Ellingood, Collinsville, Okla.	Carl John Nicholson, Neola
John Harrison Epler, Meriden	George Cornelius Nohlen, Cleburne
Clemens Albert Faeth, Wellington	Albert Philip Nutsch, Haddam
Ray Byron Flippo, Abilene	Julius Rudolph Olson, Leonardville
Orville Edwin Frantz, Conway Springs	Henry John Oltjen, Leona
Ralph Wesley Freese, Lawrence	Glen Allen Paris, Dighton
Frank Frisbie, Kingman	Henry Paul Peterson, Bremen
Clyde Dow Frost, Blue Rapids	Merrell Philbrook, Washington
John Alpha Garst, Moreland	George McClellen Pope, Udall
Victor Gates, Coldwater	Thomas Alfred Posey, Larned
George Charles Puis Gehrke, Herington	Lloyd Spencer Prentice, Goodrich
Allen George, Liberal	John Wallace Ramsey, Benkelman, Neb.
Harry Girod, Towanda	Willis Jackson Ray, jr., Wilmore
Abraham Grabill, Hesston	Harold Lee Reid, Holton
George Harold Graham, Logan	Adolph Riesen, Hillsboro
Harold Graham, Winfield	Max Roberts, Pomona
Leon Lincoln Gray, Wabaunsee	Rheuben George Robison, Oak Hill
Milton Willard Greene, Bazaar	Alva John Salts, Manhattan
Charles Gregory, Devizes	Charles Schafer, Broughton
Percy Victor Gugler, Ellis	Carl Schoneweis, Clay Center
Charles Hagan, Clayton	Frank Schoneweis, Clay Center
Elmer Hanson, Olsburg	John Searl, Morland
Henry Christopher Harries, Wa Keeney	Don Lyle Selbe, Phillipsburg
	Albert Edwin Severson, Leona
	Donald Oneil Signor, Manhattan
	Donald Skinner, Medicine Lodge

FARMERS' SHORT COURSE—*continued*

Guy Herbert Smaller, Perry	Mack Allyn Werts, Smith Center
Channing Smith, Pittsburg	Walter Wessler, Bushton
Neal Smith, Arcadia	John Doane Whitecomb, Cottonwood Falls
Lester Stanton, Emporia	Frederick Lorence Wiegand, Inman
Eber Clarine Swanson, Axtell	Everett Wilson, Rozel
Francis Arthur Swenson, Concordia	Fred William Winter, Bucklin
Carl Henry Tangeman, Newton	Harry Palmer Witham, Manhattan
Oliver Sewell Tarr, Coldwater	Virgil Archer Woods, Scandia
Edward Arthur Tilberg, Dwight	Christian Cornelius Wychoff, Luray
Dewey Nelson Turner, Fowler	Truman Columbus York, Wilmore
Glenn Rae Vessey, Clayton	Raymond Evens Young, Wallace
Chris Daniel Voran, Basil	Ernest Louis Zimmerman, Osborne
Peter Wagner, Potter	

Commercial Creamery Short Course

Raymond Earl Ambrose, Norton	Roy Edwin Gish, Abilene
Earl Joe Barker, Valley Falls	Paul Higgins, Kansas City
Albert Brown, Manhattan	John Chester Hunt, Manhattan
Everett Davis, Iola	Harold McKee, Manhattan
Ira Derr, Garnett	Donald Leslie Marston, McPherson
Ora Derr, Garnett	Chester Cecil Morse, Phillipsburg
Alva Eugene Eidson, Liberal	William Dysart Wilson, Manhattan

Shop Work Short Course

Harry Billau, Moundridge	William Jacob Moore, Glen Elder
Ulysses Grant Bowen, St. John	Herbert Regier, Moundridge
John Henry Fanshier, Great Bend	Walter Dewy Sandow, Dillon
Eugene Theodore Frankenhoff, Atchison	Ray William Schowalter, Moundridge
Willie Stephen Grabill, Hesston	Orlo Otis St. John, Rocky Ford
Earl Cameron Howard, Oakley	Harold Benton Wilcox, Sylvan Grove
Alva Alfred Ihde, Hope	Wright Yarrow, Clay Center
Clarence Albert Matti, Cottonwood Falls	

Traction Engine Short Course

SECOND YEAR

Warren Thomas Avery, Wakefield	Harry Herbert Klusman, Seneca
Raymond Houston Branson, Claude, Tex.	Albert Charles Krehbiel, Pretty Prairie
James Burke Campbell, Manhattan	Earl Manners, Lucas
Roland Garfield Campbell, Manhattan	John Henry Meyer, Galva
James Carmody, Cawker City	John Morris, Council Grove
Ralph Merrill Champion, Larned	Merle Moyer, Oak Hill
Maurice Edwin Dubbs, Ransom	George Walter Patterson, Manhattan
Fred Rudi Geib, Courtland	Chester Ray Peterson, Marquette
Ralph William Glockle, Havana	Jesse Emmett Weikel, Solomon
Ray Everett Hall, Natoma	James Fred Timmerman, Emporia
Loyal Dwight Hoyt, Louisburg	Otto Frederic Uppendahl, Amy
Will Karrigan, Clay Center	Ernest Walker, Anthony

FIRST YEAR

Severt Martin Ahlberg, Morganville	Wayland Hoy Crannell, Parsons
Chester Arthur Anderson, Manhattan	Charles Hammond Davis, Turon
Adam Applegate, Luray	Merwin Brooks Davis, Manhattan
Paul Keith Applegate, Ashland, Ohio	Alois Dechant, Antonio
Frank Peter Baird, Brewster	Jake Deckert, Pawnee
Chester Behermeyer, Robinson	Otis William Degarimore, Elk City
Marshall Boller, Junction City	Harold Orville DePue, Buffalo, Okla.
Ralph Alexander Bradley, Garnett	Harold Andrew Douglas, Holton
Ralph Merle Bradley, Jetmore	Edwin Howard Edgerton, Randolph
Charles Brady, Logan	Willis Green Edwards, Manhattan
Edwin Michel Burk, Cassoday	Pender Estes, Sampson, Alberta, Canada
William Thomas Caldwell, le	Raymond Earl Fairchild, Westmoreland
Ernest William Campbell, Caldwell	Elmer Clem Fisher, Alta Vista
Ralph Harmond Campbell, Caldwell	Frank Frey, Elk
Albin Marion Carlson, Leonardville	Harold Martin Gates, Seward
Marion William Carlson, Leonardville	Chester Gaunt, Great Bend
Henry Carstens, Jennings	Frank Gleason, Parsons
Alvin Kent Clark, Jefferson	Hardy Lewis Golden, Parsons
Howard Clark, McPherson	John Charles Graebner, Macksville
William Thorn Compton, Ray	Frank Henry Green, Lone Wolf, Okla.
Clarence Dewey Craft, Kinsley	Lennie Lee Hammer, Rosalia

TRACTION ENGINE SHORT COURSE—*continued*.

Willis Wilson Haseltine, Cawker City
 Merlin Wilson Hawk, Salina
 Cecil Edwin Hepler, Cottonwood Falls
 Joe Hoffman, Fowler
 Homer William Holaday, Parsons
 Harold Howard, Macksville
 Henry William Hoyer, jr., Marysville
 Ralph Edward Hunter, Manhattan
 Warren John Hupfer, Bunker Hill
 Henry Harold Hurt, Ramona
 Charles Robertson Jackson, Mayo
 George Jackson, Garnett
 Laurence Albert Jacobson, Densmore
 Robert Emanuel Jacobson, Waterville
 Dan Leo Jantz, Larned
 Guy Calvin Jenkins, Coldwater
 Guener Arthur Jevons, Wakefield
 Yohanes Kadak, Leland, Russia
 Albert William Keast, Larned
 Ralph Scott Kendle, Council Grove
 Ray Kohler, Glen Elder
 Henry Koppmann, Moundridge
 George Frederick Kreipe, Tecumseh
 Wilbur Fred Kubin, McPherson
 Horace Lane, Humboldt
 Urlen Lanham, Grainfield
 Roy William Lauffer, Farmington
 Willie Lehmer, Canton
 William Leonhardt, Clay Center
 Bert Clark Lies, Minneola
 Archie Jo Lindsey, Red Oak, Iowa
 Waldo Magnus Lofgren, Leonardville
 Rudolph Fernand Lundeen, McPherson
 Charles Orin Lyon, Detroit
 Clifford McKeown, Webber
 Aubey Lorenzo McMickell, Marquette
 Harold Warren Machmer, Wakefield
 Claude Clinton Marquand, Ogallala
 Herman Carl Meinert, Lone Wolf, Okla.
 Robert Miner Milton, Stafford
 George Gilbert Montgomery, Denison
 Walter Thomas Mosier, Munden
 Eddie Nelson, Jamestown
 James Ernest Nettroner, Lost Springs
 Fred William Neu, Hill City
 John Nicklin, Emporia
 Francis Nixon, Ogallala
 Tom Norton, Cottonwood Falls
 Dewey Hobson Ohlson, Atwood
 Carl Peterson, Waterville
 Henry Lawrence Peterson, Lindsborg
 Charley Pearson Pettit, Junction City
 Karl Niel Pfeutze, Randolph
 Holly Poling, Phillipsburg
 James Michael Priest, Concordia
 Cleysen Roy Raffenberg, Carlton
 Charley Truman Read, Longford
 Carl Reed, Ramona
 Bernard Rinard, Parkerville
 Louis Adam Ritz, Cawker City
 Frank Darton Robb, Scott City
 Harry Alexander Robson, Carlton
 Dean Rodgers, Rantoul
 Millerd Raymond Rodgers, Rantoul
 Edward Sander, Hilltop
 Jake Jacob Sattler, Reading
 Christian Samuel Schmidt, Chapman
 Charles Jacob Seidel, Tipton
 Frank George Seidel, Tipton
 Albert Everette Sharp, Riley
 Claud Wesley Shirk, Newton
 Lyman Short, White Cloud
 John Paul Siglinger, Phillipsburg
 Harold Arthur Simpson, Beloit
 William Sorg, Manhattan
 Frank Spangler, Newton
 Clifford Sparks, Kingman
 Norman Robert Sparrowhawk, Wakefield
 William Robert Speirs, Elk City
 Floyd Otto Spoon, Lucas
 Warren Allen Stanton, Ashland
 Fred William Steenbock, Sylvan Grove
 Noble Stevenson, Atwood
 Joe John Straka, McPherson
 Carl Frederick Strathe, McCune
 Raymond Stratman, Webber
 Russell Chapman Strickler, Ransom
 James Bryan Strohm, Wamego
 Raymond Thomas Taylor, Soldier
 Frank Wallace True, Peck
 Oliver Gwun Turman, Grainfield
 Gordon Ray Vance, Dodge City
 Emery Clifford Vilander, Manhattan
 August Peet Vogts, Moundridge
 Wilson Wade, Howard
 Truman Wert Wadsworth, Topeka
 Kuben Leonard Walline, McPherson
 Lawrence Wassinger, Hays
 Virgil Weaverling, Codell
 Louis Conrad Weber, La Crosse
 William Weber, La Crosse
 Richard White, Garnett
 George August Wilcox, Manhattan
 Morris William Wilcox, Hartford
 George Washington Wilnerd, Norcatur
 George Wilson, Carlton
 Jesse Witham, Norcatur
 Harry Eastman Wood, Manhattan
 Albert Henry Yost, Downs
 Edmund Zimmerman, Osborne

Summary of Attendance, 1916-1917.

	Agriculture	Veterinary Medicine	Mechanic Arts	Agricultural Engineering	Architecture	Civil and Highway Engineering	Electrical Engineering	Mechanical Engineering	Home Economi- cs	General Science		Industrial Journalism		Music Special		Total		Grand total
	Men.	Men.	Men.	Men.	Men.	Men.	Men.	Men.	Women.	Men.	Women.	Men.	Women.	Men.	Women.	Men.	Women.	
Graduate.....	19		5	3	7	10	16	7	5	20	19	4	2			44	24	68
Senior.....	92	9		5	4	9	20	16	111	14	17	9	7			162	120	282
Junior.....	127	15		5	5	13	20	16	140	16	10	9	7			221	157	378
Sophomore.....	*147	23		5	5		28	27	148	34	22	12	71			292	179	471
Freshman.....	†189	31	154						217	48	34	7	13			427	266	693
Special.....	24	13	12						22	24	63			5	9	78	94	172
School of Agriculture, special																156	81	237
School of Agriculture, first year																91	37	128
School of Agriculture, second year																34	8	42
School of Agriculture, third year																8	7	15
Lunch-room Management																		10
Housekeepers' Course																		103
Farmers' Short Course, first year																176		176
Farmers' Short Course, second year																52		52
Commercial Creamery Short Course																14		14
Traction Engine Short Course, first year																152		152
Traction Engine Short Course, second year																24		24
Shop Work Short Course																15		15
Summer School																219	367	586
Totals.....	598	91	171	13	16	32	64	50	643	156	155	32	29	5	9	2165	1453	3618
Counted twice.....																148	131	279
Net totals.....																2017	1322	3339

*One woman. †Two women.

Students by States and Counties, 1916-'17

STATES

Kansas	3,182	Montana	1
Arizona	1	Nebraska	27
Arkansas	6	New Mexico	2
California	2	New York	1
Colorado	8	Ohio	3
Georgia	1	Oklahoma	19
Idaho	1	Pennsylvania	4
Illinois	4	South Dakota	1
Indiana	2	Tennessee	1
Iowa	6	Texas	15
Massachusetts	2	Wisconsin	2
Michigan	2		
Minnesota	2	Total	3,384
Missouri	38		

FOREIGN COUNTRIES

Canada	1	Mexico	2
Greece	2		
Ireland	1	Total	6

Grand total, 3339

KANSAS COUNTIES

Allen	21	Lyon	42
Anderson	28	McPherson	59
Atchison	8	Marion	40
Barber	25	Marshall	42
Barton	20	Meade	6
Bourbon	12	Miami	19
Brown	39	Mitchell	31
Butler	42	Montgomery	31
Chase	23	Morris	36
Chautauqua	6	Morton	11
Cherokee	8	Nemaha	20
Cheyenne	4	Neosho	16
Clark	11	Ness	21
Clay	52	Norton	25
Cloud	34	Osage	33
Coffey	17	Osborne	18
Comanche	20	Ottawa	13
Cowley	47	Pawnee	34
Crawford	13	Phillips	19
Decatur	14	Pottawatomie	56
Dickinson	53	Pratt	8
Doniphan	15	Rawlins	5
Douglas	32	Reno	43
Edwards	12	Republic	40
Elk	11	Rice	26
Ellis	8	Riley	860
Ellsworth	15	Rooks	10
Finney	15	Rush	12
Ford	17	Russell	18
Franklin	27	Saline	28
Geary	31	Scott	8
Gove	5	Sedgwick	84
Graham	13	Seward	13
Grant	2	Shawnee	83
Greenwood	41	Sheridan	2
Hamilton	4	Sherman	4
Harper	39	Smith	20
Harvey	37	Stafford	25
Haskell	2	Stanton	1
Hodgeman	5	Stevens	1
Jackson	33	Sumner	44
Jefferson	23	Thomas	17
Jewell	35	Trego	12
Johnson	28	Wabaunsee	32
Kearny	2	Wallace	9
Kingman	14	Washington	36
Kiowa	9	Wichita	2
Labette	32	Wilson	12
Lane	7	Woodson	9
Leavenworth	23	Wyandotte	46
Lincoln	23		
Linn	25	Total	3,182
Logan	8		

Record of Attendance, 1863-1917.

College Year.....	Summer School.....	Home economics short course.....	Commercial creamery short course.....	Dairy short course.....	Farmers' short course.....	Apprentice.....	Special.....	Preparatory.....	School of Agriculture.....	Sophomore.....	Junior.....	Senior.....	Graduate.....	Counted twice.....	Total.....	Graduated.....
1863-64								93		14					107	
1864-65								90		14					113	
1866-67								154		11					178	6
1867-68															168	
1868-69								146		11					170	
1870-71								164		13					194	5
1871-72								162		22					202	3
**1873															*217	2
1873-74															183	5
**1874															*243	
**1875															237	2
**1876															303	5
**1877															228	9
1877-78								75		42					150	4
1878-79										89					207	9
1879-80										166					276	7
1880-81										178					267	8
1881-82										227					312	9
1882-83										241					347	12
1883-84										255					395	17
1884-85										271					401	14
1885-86										273					428	21
1886-87										303					481	21
1887-88										305					472	22
1888-89										266					445	25
1889-90										307					514	27
1890-91										343					593	52
1891-92										336					584	35
1892-93										339					587	39
1893-94										275					555	39
1894-95										276					572	57
1895-96										353					647	66
1896-97										321					734	55
1897-98										316					803	69
1898-99										306					870	53
1899-00										376					1094	58
1900-01										348					1321	60
1901-02										396					1396	52
1902-03										471					1574	55
1903-04										403					1605	102
1904-05										289					1462	107
1905-06										373					1690	96
1906-07										411					1937	119
1907-08										450					2192	116
1908-09										491					2308	139
1909-10										456					2305	146
1910-11										533					2407	204
1911-12										337					2523	280
1912-13										444					2928	232
1913-14										516					3027	289
1914-15										575					3089	228
1915-16										605					3314	357
1916-17										693					3540	

*Estimated.

**Calendar year.

Home-study Service Courses

There were 6156 active students taking Home-study Service courses from July 1, 1916, to March 15, 1917. These students were classified as follows: Reading courses, 5109; extension courses, 508; credit courses, 539. The names and addresses of those taking reading courses are not given, but the students taking extension and credit courses follow:

Extension Courses

P. W. Almstead, Lansing	R. F. Burleson, Leavenworth
Jack Amison, Lansing	E. T. Bolen, Kiowa
Roy N. Anderson, Overbrook	Emma Bungardner, Lansing
Grace Armstrong, Salina	William Burdett, Lansing
Edith Arnold, Summerfield	Adolph Burns, Lansing
Leonard Asher, Leavenworth	Wm. Burns, Leavenworth
Le Nota Athey, Nickerson	Lewis Busch, Lansing
Van Ness R. Ayars, Leavenworth	D. J. Butler, Lansing
H. Bailey, Leavenworth	Thomas J. Cahill, Leavenworth
S. A. Bain, Lansing	E. H. Calder, Atlanta, Ga.
Francis Baird, Minneapolis	Leslie Carle, Burlingame
Earl Baird, Minneapolis	Malcom Cameron, Leavenworth
Charley Baker, Lansing	W. Carrico, Leavenworth
John Baker, Lansing	Helen Cassidy, Leavenworth
Ruth Baker, Aulne	Ralph Childress, Lansing
C. W. Banta, Leavenworth	A. C. Clark, Ottawa
Jesse Banta, Leavenworth	Worth Clemmons, Lansing
T. Barker, Lansing	W. E. Cloepfl, Lansing
Myrtle Barker, Frankfort	Harlan Collett, El Dorado
Amos Barley, Formoso	James Clyce, Lansing
Oscar Barnhart, Overbrook	S. C. Collier, Coffeyville
Walter Barnes, Leavenworth	Earl Collins, Topeka
Walter Barnes, Oswego	Mrs. Marguerite Collins, Topeka
Grace Bartlette, Walnut	Sadie Colwell, Lansing
C. Bauman, Lansing	Grant Colvard, Lansing
J. W. Beck, Lansing	Tillie Colwell, Lansing
Wm. Bends, Lansing	Commodore F. Cool, Delphos
A—421 Bethel, Pontiac, Ill.	David Coop, Lansing
R. L. Bevens, Lansing	Charles Cordts, Overbrook
Effie Beverly, Lansing	John W. Cordts, Overbrook
Clifford Beverly, Lansing	D. Cotton, Lansing
Lee Bidwell, Lansing	Blanch Cox, Sutherland, Neb.
A. Biggs, Lansing	9881—Cox, Pontiac, Ill.
Geo. Billings, Rosewell, N. M.	Charles Creason, Lansing
Otto Binkley, Lansing	A800 Crutchfield, Pontiac, Ill.
Sam Bitler, Lansing	Wm. Dale, Leavenworth
J. R. Blair, Lansing	Andres Daly, Leavenworth
Marion Black, Overbrook	E. W. Dales, Eureka
John Blackburn, Overbrook	Will Daniels, Lansing
James Blunt, Greeley	Lock Davidson, Wichita
P. F. Boese, Buehler	Wilbur S. Davidson, Chanute
John R. Bollin, Axtell	H. Davis, Lansing
Arlie Boltz, Amy	Glen Davis, Lansing
A—334 Borland, Pontiac, Ill.	9899—Davis, Pontiac, Ill.
Mrs. Mark Borrer, Manhattan	Harry Davis, Lansing
D. Bostwick, Lansing	Lloyd Davis, Sharon
E. T. Bowman, Lansing	Victor Davy, Leavenworth
C. Bowman, Lansing	Harold Davy, Leavenworth
Lucy Bowman, Lansing	P. J. Day, Lansing
M. E. Bowman, Clifton	Jas. R. DeArmond, Wilson
Claude L. Bowden, Leavenworth	Sam R. Deen, Lewis
Herbert Boyce, Lansing	Joe DeHaven, Lansing
Ralph Bradshaw, Coldwater	Wm. P. Deitz, Sedgwick
Vernon Branch, Lansing	C. O. DeVore, Greenwich
Frank Brandt, Leavenworth	Anna Dennison, Edmeston, N. Y.
Marion Branson, Overbrook	Robt. Dilley, Leavenworth
Effie Brittain, Buffalo	Mabel Dimery, Lansing
W. J. Broom, Falun	Henry Dimery, Lansing
Geo. Braumas, Leavenworth	Beatrice Dodd, Detroit, Mich.
J. H. Brown, Gridley	Frank Doll, Greenwich
Will Brown, Beattie	Chas. Dougherty, Lansing
Fannie Brown, Lansing	John Dougan, Leavenworth
Millie Brown, Onaga	Lige Douglas, Lansing
Lyman Buck, Lansing	Wm. Doyle, Lansing
Myrtle Buehler, Lucas	Mrs. O. P. Drake, Huron, S. D.
Wm. Burditt, Ness City	Dr. H. E. Dunham, La Harpe
Noel Burt, Shallow Water	E. J. Dumond, Garden City
F. H. Butler, Leavenworth	

EXTENSION COURSES—*continued*

Ada Dupree, Lansing	Emil Huther, Leavenworth
John Durand, Lansing	N. M. Hutchinson, Ramona, Okla.
Daisy Dye, Lansing	A. Jackson, Lansing
Forrest Eagle, Nickerson	C. W. Jackson, Leavenworth
Ernest Edge, Wathena	Jas. L. Jacobson, Salina
Paul Egerhos, Leavenworth	Geo. Jeffries, Lawrence
Samuel Eitzen, Hillsboro	E. M. Jenkins, Leavenworth
R. W. Ellenberger, St. John	Vernon Jett, Leavenworth
Clarence P. Emery, Esbon	Arthur Johnson, Lansing
W. F. Evans, Lansing	Emil Johnson, Ellis
Leroy Everett, Lansing	Thomas Johnson, Leavenworth
M. Fausler, Lansing	Wm. Johnson, Lansing
H. W. Felton, Natoma	Virgil Johnson, Lansing
Fred Fisher, Overbrook	A. E. Jones, Wathena
Harold Fisher, Overbrook	A. S. Jones, Leavenworth
Harry Fletcher, Lansing	Horace B. Jones, Lansing
Chas. Flowers, Lansing	I. B. Jones, Lansing
Ida Fogelsburg, Pittsburg	John Jones, Lansing
Harry Foster, Leavenworth	O. W. Jones, Lansing
John Fountain, Lansing	W. M. Jones, Lansing
O. L. Freeman, McAllister	Wm. T. Jones, Leavenworth
B. H. Fuller, Leavenworth	John Jordan, Lansing
Ben Fuller, Lansing	Tillie Jordan, Lansing
Sam Gamble, Lansing	Wm. P. Joyce, Atlanta, Ga.
Jos Gentle, Leavenworth	J. H. Kallem, Lansing
Wm. R. George, Oakley	Tillie Kaluska, Lansing
J. H. Gibson, Leon	Roy Karness, Overbrook
C. B. Gillen, Lansing	J. H. Kavanaugh, Lansing
J. J. Goetz, Lansing	Wm. Kelly, Lansing
C. E. Gordon, Independence	H. Kelley, Lansing
Richard Glotzback, Paxico	L. M. Kelleher, Burlingame
Tice Golden, Lansing	Alfred Kemp, Atlanta, Ga.
Clara Goodrich, Stockton	J. F. Keneday, Leavenworth
9996—Gorman, Pontiac, Ill.	Wm. Kepler, Kansas City
U. S. Gray, Lansing	Mrs. C. N. Kerr, Americus
Wm. H. Gray, Leavenworth	R. T. Kersey, Garden City
H. Gray, Lansing	Carl C. King, Narka
E. Green, Lansing	Harry Kirk, Leavenworth
H. J. Green, Eskridge	Asa Knight, Lansing
A47 Green, Pontiac, Ill.	Emma Kouns, Randolph
Chas. D. Grimm, Leavenworth	Geo. Kovan, Rossville
F. Griffin, Lansing	Walter Krattli, Turner
Albert Gunn, Lansing	H. H. Konantz, Brownell
Solomon Guthrie, Lansing	Benjamin Lancaster, Leavenworth
John H. Hackley, Concordia	Frank Lane, Atlanta, Ga.
J. P. Haggard, Baldwin	W. Lounsberry, Leavenworth
Alice Haigh, Elmont	Jacquin La Rose, Lansing
Mary Halford, Topeka	Samuel Langford, Lansing
Victor Hall, Osage City	Chas. Laub, Lansing
Abram Hammitt, Topeka	W. S. Lawrence, Lansing
L. W. Hamphill, Princeton	Fred E. Lefler, Lansing
Louis Hanne, Overbrook	Elmer Lemmings, Lansing
Leon Harden, Nickerson	J. Lichtig, Leavenworth
Henry Hargen, Leavenworth	E. Lisle, Leavenworth
J. I. Harkness, Overbrook	Arthur Lindsay, Lansing
Mrs. John Harmon, Herington	Benjamin Locker, Atlanta, Ga.
Dave Harris, Lansing	Wm. Lockwood, Lansing
R. M. Harrison, Leavenworth	Wm. Lounsberry, Leavenworth
Jesse E. Harrison, Lansing	R. H. Long, Burlington
P. E. Hawkins, Greensburg	Margaret Lormimer, Preston
Everett Hays, Moline	J. S. Lupton, Cimarron
Eli Heberling, Overbrook	Alta Marie Lux, Kansas City
E. Hefferman, Leavenworth	Id. M. Mace, Lansing
Roy Heller, Herndon	Benjamin Maddox, Leavenworth
Cassius Hemenway, Rush Center	9918—Magner, Pontiac, Ill.
Louis E. Henderson, Richmond	A281, Pontiac, Ill.
B. F. Hill, Lansing	Sister Magdalene, Kansas City
F. R. Hine, Le Roy	Lula Magill, Mayfield
G. C. Hitchcock, Sylvan Grove	J. E. Mahannah, Harper
James Hollister, Quincy	F. H. Manning, Council Grove
Murray Hollingsworth, Lansing	W. M. Maree, Lansing
Clarence Horstman, Kansas City, Mo.	D. T. Martin, Lansing
Wm. I. Hosley, Leavenworth	Grace Martin, Waverly
Reginald Hudson, Leavenworth	Harry Martin, Utica
Arthur Hugendubler, Lansing	James Martin, Lansing
George Hughes, Lansing	May Martinez, Lansing
Otto Hughey, Leavenworth	S. D. Martin, Horace
Floyd Hull, Portis	Chas. Marino, Leavenworth
J. M. Hullinger, Lansing	J. W. Marston, Highland

EXTENSION COURSES—continued

- A. L. Mason, Lansing
 A21 Matthews, Pontiac, Ill.
 W. H. Maxwell, Topeka
 Luther May, Lansing
 John S. McBride, Lovewell
 W. T. McCarthy, Osborne
 John McCain, Lansing
 J. Roy. McClay, Canon City, Colo.
 Sam C. McCampbell, Fowler
 Frank McCoy, Leavenworth
 Mrs. Wilma C. McCreary, Oklahoma City, Okla.
 Edgar McDaniels, Lansing
 E. McDonald, Lansing
 Chas. H. McGarry, Leavenworth
 Geo. H. McKee, Kensington
 T. B. McKee, Mulberry
 Chas. McKenzie, Lansing
 Chas. Melbourne, Leavenworth
 Jack Milne, Lansing
 John Menehan, Beattie
 Wesley Mercer, Leavenworth
 Cecil Merritt, Peabody
 Otto Meyer, Leavenworth
 W. J. Meyer, Ellinwood
 Tony Milano, Leavenworth
 Mrs. Nellie Beach Miller, Omaha, Neb.
 F. Miller, Leavenworth
 Jack Miller, Lansing
 I. C. Miller, Lansing
 Thomas Miller, Lansing
 Ward L. Miller, Sterling
 O. M. Mitchell, Lansing
 Albert Mohring, Lansing
 Henry Morris, Basil
 Wm. Moore, Lansing
 L. G. Morris, Lansing
 Martha Moser, Oakland
 Jas. Mosely, Leavenworth
 S. B. Mordy, Conway Springs
 Henry Motley, Lansing
 Julia Mulloy, Lincoln
 Roscoe Mustoe, Cullison
 Ben Myers, Manhattan
 W. J. Myers, Ellinwood
 Frank Nelson, Marion
 Peter Ninkhanen, Leavenworth
 Leonard Noll, Ness City
 R. W. Nott, Clay Center
 J. F. Odle, Westmorland
 P. W. Olmstead, Lansing
 T. E. Osborne, Belle Plaine
 Ed L. Otterson, Lansing
 Earl Owens, Lansing
 J. C. Owen, McPherson
 A653 Paaren, Pontiac, Ill.
 Angelus Palimanacos, Leavenworth
 Shirley O. Parr, Rossville
 W. S. Pate, Walnut
 Wm. Patras, Leavenworth
 M. S. Patton, Kansas City
 Chas. Pearson, Lansing
 Mrs. H. C. Peiffer, Neosho, Mo.
 W. H. Penix, Salina
 9762—Peoples, Pontiac, Ill.
 L. T. Perril, Plevna
 Maurice Peters, Lansing
 Chas. Few, Nickerson
 J. Pierce, Leavenworth
 O. C. Pierce, Leavenworth
 E. W. Plummer, Leavenworth
 James Porter, Lansing
 H. E. Powers, St. John
 Watswof Poyoiniski, Lansing
 Clarence Price, Lansing
 R. N. Prizer, Glasco
 Chester J. Prosser, Leavenworth
 Perfecto Ramirez, Lansing
 W. F. Ramsdale, Caldwell
 Homer P. Ramsour, Milford
 Homer S. Rand, Plainville
 C. Ransom, Lansing
 Wm. Ready, Leavenworth
 C. J. Reed, Lyons
 Roy Rector, Lansing
 John E. Reeves, Leavenworth
 Harry Reeves, Conway Springs
 A. C. Reider, Leavenworth
 Erwin Remelius, Leavenworth
 John Rethiford, Lansing
 C. B. Reynolds, Leavenworth
 C. E. Reynolds, Dunlap
 J. Rhinehart, Leavenworth
 Charles Richards, Overbrook
 Robt. F. Richards, Hutchinson
 Jake Riley, Lansing
 John Riley, Atlanta
 Chas. H. Rinehart, Piedmont
 F. J. Robbins, Cherokee
 A290 Robinson, Pontiac, Ill.
 Frank Rollins, Lansing
 W. D. Royer, Herington
 Henry Russell, Rosewell, N. M.
 C. A. Rutherford, Lansing
 Bertha Sallee, Hutchinson
 J. A. Salyer, Lansing
 H. P. Sanders, Leavenworth
 Herbert Sargent, Lansing
 H. W. Sawhill, Dorrance
 Wm. Schaben, Lansing
 H. A. Achapper, Lansing
 Will Scheuffer, Great Bend
 Wm. Schrivens, Leavenworth
 9921—Schultz, Pontiac, Ill.
 L. S. Schwab, Cherokee
 Chas. Scott, Lansing
 C. S. Seitz, Lansing
 Otto Shambrooks, Lansing
 Lula Shaw, Conway Springs
 Chas. Sherlock, Lansing
 J. E. Shunkel, Lansing
 Geo. W. Sidwell, Ness City
 Alice Simon, Westmoreland
 Mrs. Effie C. Smeelk, Victoria, B. C.
 David Smith, Lansing
 John Smith, Lansing
 Frank Smith, Lansing
 Marcelene Smith, Overbrook
 R. R. Smith, Lansing
 Walter Smith, Lansing
 George Smithson, Lansing
 Luella Sneed, Lansing
 Geo. W. Somers, Lansing
 Alva Souder, Newton
 J. M. Southwell, Leavenworth
 P. W. Spurling, Leavenworth
 D. W. Stallard, Holton
 Frank Starr, Lansing
 C. B. Stebbins, Junction City
 Ned Steel, Kansas City, Mo.
 J. B. Stevens, Leavenworth
 Arthur Stewart, Lansing
 J. W. Stockebrand, Jewell
 Robert Stone, Leavenworth
 Earl H. Stout, Leavenworth
 Ivar Olsen Stuejard, Abilene
 Geo. H. Stukenbroeker, Maple Hill
 H. O. Sutcliff, Wheaton
 P. L. Swartley, Cheyenne, Wyo.
 Sister Symphrosa, Kansas City
 Earl Taton, Overbrook
 Benjamin Tanner, Atlanta, Ga.
 Ruben Tapper, Marquette
 Frank H. Thiers, Oxford
 Chas. Thomas, Taylor, Tex.
 Chas. Thomas, Lansing
 J. Thomas, Lansing
 Will Thomas, Lansing
 James Tillman, Lansing
 Kenneth Topping, Overbrook

EXTENSION COURSES—*continued*

A. G. Tritt, Larned	Will Wheeler, Lansing
T. E. Turner, Lansing	Pat White, Lansing
Robert Turner, Leavenworth	T. E. White, Leavenworth
O. W. Twellegger, Lansing	John Whitman, Sedan
Wm. Upright, Lansing	Mrs. C. S. Whisnant, Goodland
Manual Underwood, Leavenworth	E. Wilbur, Lansing
S. Viney, Leavenworth	Harry Wilson, Leavenworth
P. C. Vilander, Peabody	James Wilson, Lansing
Toribio Del Villar, Colon, Cuba	Murray Wilson, Oswego
Gladys Vincent, Overbrook	H. C. Wilson, Lansing
C. A. Waits, Cassody	Carl Williams, Leavenworth
R. D. Walden, Auburn	Alfred Williams, Lansing
John Walker, Lansing	G. H. Williams, Leavenworth
Frank Walker, Lansing	Ed. Williams, Lansing
J. F. Wallace, Leavenworth	Frank Williams, Lansing
W. H. Wallace, Leavenworth	Ralph Williams, Kenneth
Marine Warden, Lyons	A. Willis & Co., Ottawa
J. W. Warne, Rose Hill	Robert T. Wing, Lenore
Amos Webb, Lansing	J. C. Winston, Kansas City, Mo.
D. A. Webber, Bunker Hill	W. N. Wimmer, Robinson
John Weekley, Lansing	Lester Withers, Lansing
Fred A. Wegener, Leavenworth	B. E. Williams, Lansing
Wm. West, Leavenworth	S. E. Woodward, Ashland
C. Omer West, Netawaka	Herman Wright, Lansing
John W. Wells, Elmdale	W. A. Wright, Leavenworth
Riley Welch, Lyons	Surkin Yvon, Atlanta, Ga.
Elta Westrup, Woodbine	R. E. Young, Miltonvale
D. F. Wheeler, Lansing	Elmer E. Zavodosky, Delia

Credit Courses

Walter B. Adair, Miami	U. S. Blakely, Neodesha
Cecyle Adams, Junction City	H. T. Boese, Goessel
Mabel Adams, Garden City	K. C. Boggs, Topeka
Jessie Adee, Minneapolis	Will R. Bolen, Leroy
James Alsop, Wakefield	Mable Botkin, Manhattan
L. R. Alt, Little River	Jesse E. Bower, Simpson
R. B. Ambrose, Blue Rapids	Ellinomor M. Boyd, Terhune, Wyo.
Harold Amos, Manhattan	J. F. Braun, Leavenworth
Helena M. Anderson, Lewis	Emma Brelsford, Jennings
M. H. Anderson, Garden City	Walter G. Briggs, Fort Collins, Colo.
Sudie Anderson, Oskaloosa	Geraldine H. Broaddus, Leavenworth
Bertha Anderson, Kinsley	Irene Brooks, Parsons
Edith Irene Andrews, Madison	John R. Brooks, Wellington
W. R. Anthony, Seneca	Lester R. Brooks, Winfield
A. C. Apitz, Manhattan	May Brookshier, Chillicothe, Mo.
C. H. Alsbaugh, Mt. Vernon, Tex.	Hazel Brown, Manhattan
Bertha Altus, Holcomb	Helen M. Brown, Holton
Charles Atwood, La Cygne	James J. Brown, Leavenworth
L. N. Arnold, Manhattan	Margaret S. Browne, Topeka
Ruth Arbuthnot, Belleville	W. L. Browning, Sherwin Junction
B. E. Austin, Manhattan	Wesley G. Bruce, Wilson
M. C. Badgley, Cantonment, Okla.	Lillian Bucheim, Leonardville
Bagdasar K. Baghdigian, Manhattan	A. U. Burdett, Manhattan
Leland I. Baker, Baldwin	Elizabeth Burnham, Kansas City
Eunice Ann Baird, Cherryvale	L. E. Burton, Muncie, Ind.
Oling A. Baldwin, Elmdale	W. H. Burress, Bethany, Mo.
Mrs. Flo E. Ballard, Bethany, Mo.	Fannie Butts, Fredonia
Mildred Barackman, Howard	Frank S. Campbell, Manhattan
Mrs. Anna Barnhardt, Pomona	Katherine Campbell, Houston, Tex.
Estella Barnum, Simpson	J. A. Cannan, Erie
Elmer E. Bates, Perry	Reppie Carey, Manhattan
Wood Bass, El Dorado	James Carle, Gretna
Margaret Barrows, Atchison	Mrs. Alice Carr, Harner
Matilda Batliner, Colby	Mrs. Nettie B. Cartmel, Emporia
Myrtle Bauerand, Minneapolis	Florence Carvin, Wichita
H. B. Bayer, Quincy	Evangeline Casto, Manhattan
Anna M. Beck, St. John	E. R. Chandler, Archer, Wyo.
Florence J. Bedell, Junction City	I. N. Chapman, Leavenworth
F. H. Beedle, Scott City	Bernice Chapman, Emporia
Rosa Beezley, Sylvan Grove	R. C. Chatman, Manhattan
Charles Bell, Berkeley, Cal.	L. C. Christie, Nickerson
H. E. Bell, Wichita	D. C. Clark, Manhattan
Sherman F. Bell, Perry	Florence Clark, Junction City
Charles E. Bemiss, Selden	Mrs. Nora R. Clark, Junction City
K. H. Bennett, Lovewell	Merl. C. Clift, Lawrence
Blanche May Berger, Sylvan Grove	
Nina Birkett, Holton	

CREDIT COURSES—continued.

L. H. Cobb, Kansas City	Dean Gardener, Lewisburg
Maude M. Coe, Yates Center	A. A. Grant, Manhattan
P. W. Coe, Yates Center	Irene Garrison, Salina
W. O. Connell, Manhattan	L. V. Garvin, Manhattan
S. H. Conner, Lincoln	B. H. Gear, Wellsford
Gertrude Conroy, Manhattan	Grace Gifford, El Dorado
Kathleen Conroy, Manhattan	Mary E. Giles, Manhattan
A. E. Cook, Russell	Edythe Gilliland, Dennison
H. Coover, Ellsworth	Dorothea Gish, Manhattan
Albert W. Copeland, Hays	Nathan Gish, Manhattan
Grace Corbin, Latham	L. Herman Glass, Leavenworth
Vera Cowell, Clay Center	B. Gleason, Manhattan
N. T. Cox, Greensburg	Anna Goddard, Valley Falls
Sylvia M. Crabill, Herndon	W. R. Gore, Raymore, Mo.
Clarence Craig, Piedmont	Stella Gould, Wilroads
Annie G. Crouch, Alma	Esmer Granger, Netawaka
Rose M. Cunningham, Manhattan	G. J. Gregory, Scotts Bluffs, Neb.
Grace Curry, Manhattan	E. E. Griffith, Bernard
Wm. R. Curry, Cottonwood Falls	Hugh A. Grimm, Leavenworth
Ida B. Curtis, Larned	P. J. Guffey, Irving
J. F. Curtis, Ogden	F. H. Gulick, Larned
Vilona Cutler, Anthony	E. W. Gunkel, McPherson
Lillie Daerfinger, Lewiston, Mont.	Laura Gustafson, Bala
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